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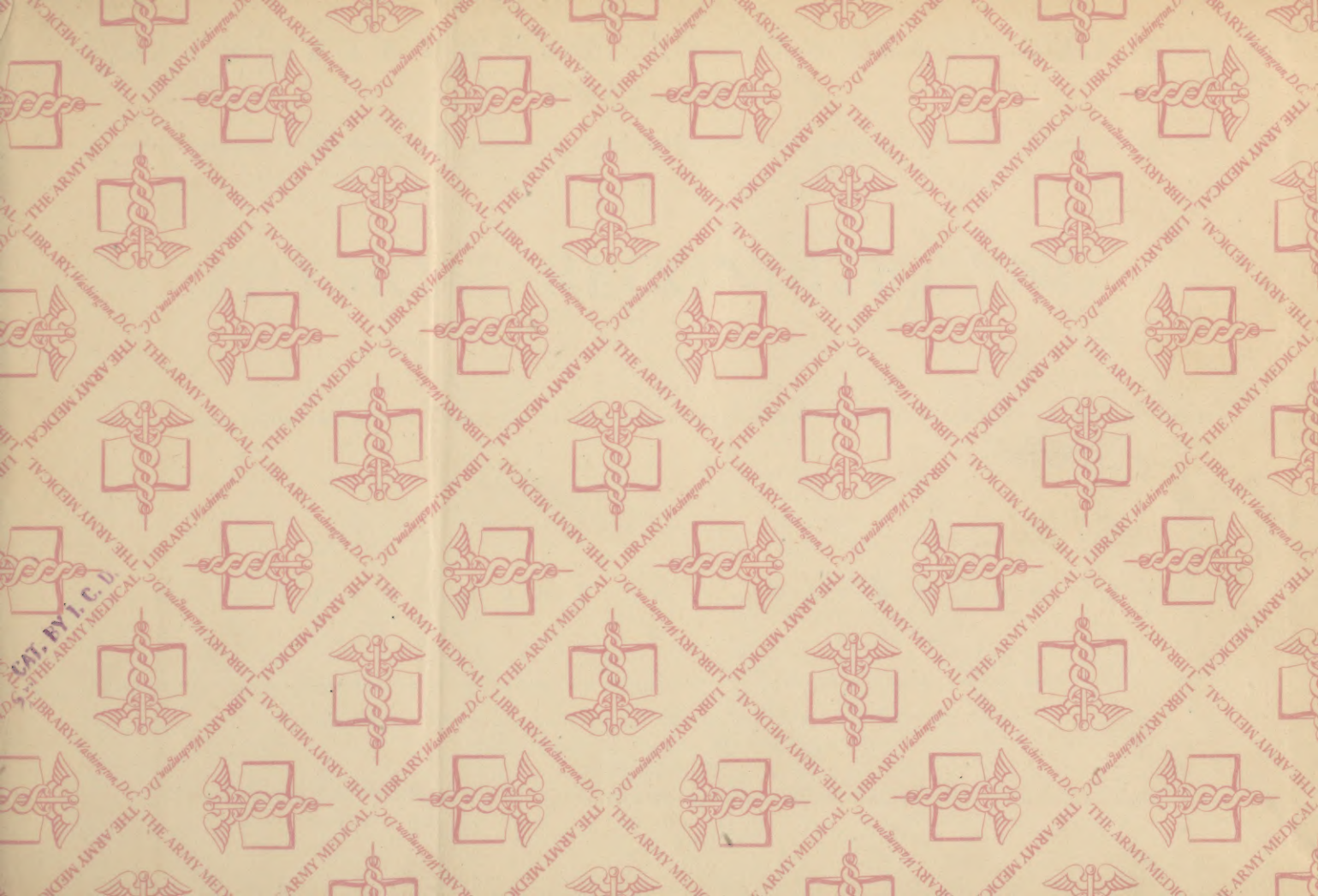
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WAR DEPARTMENT TECHNICAL MANUAL  
TM 8-292

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# PHYSICAL RECONDITIONING


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WAR DEPARTMENT • DECEMBER 1944

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WAR DEPARTMENT  
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TM 8-292, Physical Reconditioning, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

J. A. ULIO  
*Major General*  
*The Adjutant General*

WB  
541  
U58 p  
1944

G. C. MARSHALL  
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For explanation of symbols see FM 21-6



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## CHAPTER 1

### INTRODUCTION

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#### Section I. RECONDITIONING

*Place in series.* This is one of three manuals on reconditioning. They are:

TM 8-290 Educational Reconditioning.

TM 8-291 Occupational Therapy.

TM 8-292 Physical Reconditioning.

**1. GENERAL.** a. When a man enters the Army, the military training program prepares him physically and mentally for his duties as a soldier. Military drill, marches, and physical training produce good physical condition and develop endurance and stamina. Special courses, maneuvers, and field problems provide information and knowledge to enable him to perform successfully the duties of a soldier. When his training is completed, he should be in good physical condition and possess the mental attitudes necessary to the effective soldier.

b. The soldier who has been wounded or rendered inactive because of prolonged illness loses the efficiency that has been developed. His physical strength deteriorates. Concern for himself, worry over personal affairs, and the anxiety that accompanies long convalescence, contribute to a loss of confidence which may result in apathy and indifference. These attitudes actually retard recovery, and often produce unfortunate mental states which result in ineffectual service and, in some instances, maladjustment to military or civil environment.

c. The critical personnel needs of the Armed Forces and war industries demand maximum conservation of manpower. Each day that a patient's recovery is delayed represents a loss of man hours in support of the war effort. If the convalescent soldier is to realize the greatest benefit from Army medical service, his physical, mental, and emotional needs must be considered. Therefore, recognizing this responsibility to the soldier and to the war effort, the Surgeon General has established reconditioning as a part of professional medical care.

**2. MISSION.** The purpose of the Reconditioning Program is to accelerate the return to military duty of convalescent patients in the highest state of physical and mental efficiency consistent with their capacities and the type of duty to which they are being returned. Or, if the soldier is disqualified for further military service, the Reconditioning Program must provide for his return to civilian life in the highest possible degree of physical fitness, well oriented in the responsibilities of citizenship, and prepared to adjust successfully to social and vocational pursuits. The mission is accomplished by a coordinated program of Educational Reconditioning, Physical Reconditioning, and Occupational Therapy.

## **Section II. MISSION OF PHYSICAL RECONDITIONING**

**3. DEFINITION.** Physical reconditioning is the process by which physical and psychological fitness is maintained and restored through participation in progressively graded physical activities during convalescence.

**4. PURPOSE OF PHYSICAL RECONDITIONING PROGRAM.** The physical reconditioning program for the treatment of convalescent patients has been designed to—

- a.** Allay and prevent deconditioning.
- b.** Accelerate physical recovery.

**c.** Restore a patient's physical condition to a level that will fit him for return to his assigned duties in the Army or, if he is disqualified for military duty, for return to civilian life with the highest possible degree of physical fitness consistent with his capacities.

**d.** Contribute to psychological readjustment and socialization by providing enjoyable activities in which patients can participate together, and in which they are afforded opportunities for self-expression and release from physical and emotional tensions.

**e.** Teach patients who will be discharged to civilian life, activities in which they can engage in the future to maintain an adequate level of physical fitness.

## **5. PHYSICAL RECONDITIONING FOR RETURN TO DUTY.**

**a.** Before returning to duty, trainees must be free of illness or physical handicap and must have developed sufficient strength, cardiovascular and muscular endurance, and agility to meet the physical requirements of their military assignments. The physical requirements for full duty differ from those for limited duty.

**b.** Physical reconditioning plays an important part in preparing men psychologically for return to duty. Increased strength and stamina are associated with increased self-confidence and self-respect. Continued practice of combative sports and athletic games increases the ability to respond quickly and



adaptively to changing combat situations. Competitive activities develop an aggressive fighting spirit, initiative, resourcefulness, team work, and group morale.

#### **6. PHYSICAL RECONDITIONING PROGRAM FOR RETURN TO CIVILIAN LIFE.**

**a.** A high level of physical fitness must be developed in patients who will be discharged to civilian life, especially because their physical handicaps will make the problem of readjustment even harder for these men. They will be greatly assisted in reestablishing themselves as civilians if they return with a high level of physical fitness. It is also important to teach activities by which these men may maintain an adequate level of physical fitness after they return home. Activities which will provide future recreation as well as exercise should be stressed.

**b.** A well-conceived and well-directed physical reconditioning program provides one of the best means of effecting the emotional readjustment and resocialization of battle casualties. Because physical activities, particularly sports and games, appeal to patients, they elicit whole-hearted participation. This participation brings a feeling of physical well-being and release from physical and nervous tensions. Through enjoyable association with others in athletics, these patients develop healthier attitudes toward others as well as toward themselves. When **their efforts** are attended with success, they develop a feeling

of worthwhileness, a sense of achievement and belonging, and their self-confidence is restored.

#### **7. RESPONSIBILITY FOR PROCESS OF PHYSICAL RECONDITIONING.**

Health may be said to have three levels. The lowest level is that of very poor health; the second is the health level of the average man who is free of disease. The second, while one of physiological health, is below the third level, that of marked fitness for strenuous work. It is the responsibility of the medical officer to prevent descent from the *health level* and to accelerate return to it. It is the function of the physical reconditioning staff to prevent retrogression from the *fitness level* and to accelerate return to that level representing the peak of physical condition.

### **Section III. SCOPE OF PHYSICAL RECONDITIONING**

**8. MAINTENANCE AND RESTORATIVE PROGRAMS.** The maintenance program of physical reconditioning is directed toward preventing loss of the high condition level which the patient had before hospitalization. The restorative program is directed at restoring condition that has been lost. Exercise to recondition the patient should begin as soon as practicable. The maintenance phase of the program is for bed and ward ambulatory patients; the restorative phase of the program is for patients in the later stages of convalescence.

**9. GENERAL AND REMEDIAL PROGRAMS.** a. The major part of physical reconditioning is the *general exercise program*, the purpose of which is to build up the general physical condition of patients. This program includes the conditioning exercises, running, games, athletics, and a large portion of the gymnasium activities.

b. The *remedial exercise program*, which consists of individual exercises, with and without apparatus, is designed to promote the recovery of the injured or diseased tissues and to restore function to the atrophied muscles of those parts of the body that have suffered as a result of injury or disease.

#### **Section IV. GENERAL PRINCIPLES OF PHYSICAL RECONDITIONING**

**10. MEDICAL SUPERVISION OF PROGRAM.** Since reconditioning is an integral part of the convalescent treatment of the patient, medical judgment must prescribe the character of physical exercise and the time for beginning it. It is therefore essential that the medical officer understand the purposes of the program, its activities and what they can accomplish, and his relationship to them. Various methods have been formulated which permit the medical officer to exercise this supervision with a minimum expenditure of extra time yet a maximum of effective control.

**11. GRADUAL PROGRESSION.** The physical reconditioning program should begin with light exercises which are increased gradually and progressively in relation to the patient's rate of recovery. A sudden and marked increase in the amount and intensity of exercise may be dangerous for convalescent patients and must be avoided. To obtain a gradual progression the activities administered should be such that the dosage can be readily measured and controlled.

**12. OVERLOAD PRINCIPLE.** If a man is to improve his physical fitness as rapidly as possible, he must exercise to the limit of his tolerance and train for tasks of greater severity than those normally to be faced. This means a progressive increase in either the cadence or the load borne, or both. He must progressively run faster, lift or carry heavier loads, or speed up the tempo of the conditioning drills. In the early stages of training a moderate exercise program is usually enough to "overload" the existing performance ability, even in cases of Class 4 and 3 programs.

**13. INDIVIDUALIZATION OF PROGRAM.** There will be great individual variations in physical condition among convalescents. Some soldiers will have been in very good condition before they were hospitalized; others will not have attained satisfactory condition. Some will have been injured severely; others will have relatively minor injuries or illnesses. All such



types may be located in the same hospital ward and may have to be exercised at the same time. Because of these varying conditions, the reconditioning staff must adapt the exercise program to the needs of each patient, in accordance with the prescription of the medical officer. The tendency to exercise everyone in the same manner must be carefully guarded against.

**14. PATIENT ORIENTATION.** Full cooperation of the patients must be enlisted, for the reconditioning program will fail unless the desire to improve is instilled in all patients. They must be convinced that they serve their own interests by participating wholeheartedly in the program. Better results are always obtained if patients are told why they perform the reconditioning activities.

**15. INTEGRATION OF RECONDITIONING ACTIVITIES.** The medical officer must be aware of all the resources available for convalescent medical care. It is the responsibility of the officer in charge of a reconditioning service to integrate and coordinate all phases—physical reconditioning, educational reconditioning, occupational therapy, and Red Cross and special service activities. Each phase makes its contribution to the reconditioning program, and they should be correlated to the end that the most effective service is rendered each patient.

**16. PRINCIPLE FACTORS IN PHYSIOLOGY OF FITNESS.**

a. Deterioration from the fitness level follows periods of physical inactivity. Even mild exercise will retard this deterioration. A well individual may rest in bed several days and lose relatively little in condition. This is because he twists and turns, stretches, and moves around in bed. Even in sleep, the normal man changes position about every 10 minutes. When a man is ill or in pain, he lies almost motionless and relaxed, and his muscles atrophy rapidly from disuse. This is demonstrated in individuals who have undergone a knee operation. The normal leg which the patient moves around remains fairly strong, while the muscular tissue of the operated leg atrophies rapidly. It is imperative that as soon as the ward officer determines that a satisfactory health level has been established, exercise should begin, and as much exercise as can be taken with benefit to the patient should be continued throughout convalescence.

b. Beneficial effects of exercise are produced only when activities of the right type and the proper dosage are used. Too much exercise produces muscular soreness and overirritability. A well-planned conditioning program will produce the following improvements in function in the trained person, as contrasted with the untrained person:

(1) The heart and blood vessels operate more efficiently. The heart is able to pump more blood per contraction, thus doing more work with less effort; it beats fewer times per minute and returns more rapidly to normal speed after hard work.

**When called on for additional work, the heart and blood vessels have greater powers of adjustment to various grades of physical work. The number of functioning capillaries is increased, which means a corresponding increase in the circulation of the blood to the muscle cells. Because of improved circulation, the muscular system receives a better fuel supply and is better able to eliminate the biochemical waste products.**

(2) The respiratory system functions more efficiently. Fewer inhalations per minute are required; exchange of carbon dioxide and oxygen takes place more rapidly and more completely, and vital capacity is increased.

(3) The work capacity of the muscular system is increased,

the muscles increase in size and power and the trained individual becomes more efficient in their use. When the muscular system is operated with a high degree of efficiency, greater endurance is assured.

(4) The central nervous system is trained to coordinate the other systems effectively. There is an improvement in general health.

c. Proper exercise increases the individual's zeal, enthusiasm, and alertness, making him a more efficient organism. Physical conditioning produces an improved cardiovascular system and a better muscular system coordinated through a better functioning central nervous system.



## CHAPTER 2

# ORGANIZATION AND ADMINISTRATION OF PHYSICAL RECONDITIONING PROGRAM

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### Section I. CLASSIFICATION

**17. CLASSES OF PATIENTS.** *a.* Patients in the Reconditioning Program are divided into four classes:

(1) *Class 4.* Patients confined to bed or chair, or required to take all organized exercises in bed.

(2) *Class 3.* Patients in the hospital ward who still require medical or surgical treatment, are ambulatory, and may exercise in a standing position.

(3) *Class 2.* Patients no longer subject to medical treatment. These men are now spoken of as trainees, but considered as patients under medical supervision. Class 2 trainees lack considerably in physical condition or have disabilities which hinder or interfere with their efficient physical performance. The Class 2 trainee progresses to Class 1 as his physical condition warrants and the medical officer prescribes. Some trainees will not be able to progress beyond the Class 2 stage.

(4) *Class 1.* Trainees who are nearly ready for duty.

A soldier who completes the conditioning in Class 1 is discharged to full active duty. Soldiers not qualified for other than limited assignment may be discharged directly from Class 2, rarely from Class 3.

*b.* It is frequently desirable to make a finer classification, hence Class 3 and 4 patients are frequently divided into subclasses of *a*, *b*, and *c*, respectively. The *c* patient is in the poorest physical condition, the *a* patient is in the best physical condition. Occasionally a Class 4*a* patient might be in better physical condition than a Class 3*c* patient. For example: The Class 4*a* patient, who has recently had his appendix removed but is otherwise in good condition, still must remain in bed and is classified as 4*a*. He is in much better condition physically than the patient who has recently recovered from atypical pneumonia and classified as a 3*c* patient. The Classes 1 and 2 may likewise be subdivided into subclasses *a* and *b*.

*c.* It is the ward officer's responsibility to classify all his patients and to prescribe the exercises to be performed. To this

end the exercises used with Classes 3 and 4 should be carefully demonstrated and explained to all chiefs of service and ward officers, and their staffs. A chart or card upon which all exercises are illustrated will prove helpful in further acquainting medical officers with the exercises. Such a card for each patient will assist the ward surgeon in making his prescription merely by checking the exercises which are contraindicated.

**18. ADMISSION TO PHYSICAL RECONDITIONING PROGRAM.** **a. Surgical patients.** No precise measure for determining the onset of convalescence exists. The medical officer in charge will indicate when convalescence has begun, and when physical reconditioning activities may be started.

**b. Medical patients.** Although it may be safe to begin exercise for medical patients on the first afebrile day, medical opinion indicates that most patients may begin gentle exercise after 2 to 3 days of normal temperature; begin moderate exercise 1 or 2 days later, and relatively severe exercise 5 days later, unless the medical ward officer prescribes otherwise. It is medical opinion that—

(1) As a general rule patients recovered from the following diseases may begin exercise relatively promptly after they have become afebrile, and progress rather rapidly: acute infectious diseases without complications, acute infectious hepatitis, acute sinusitis, acute upper respiratory diseases, chicken pox, dengue,

dysentery (both bacillary and amoebic), hay fever, malaria, meningitis (both epidemic and bacteria), measles, mumps, pharyngitis, pneumonia (both bacterial and atypical), rat bite fever, scarlet fever, severe skin infections and infestations, and tonsilitis.

(2) Patients recovering from one of the following conditions should be treated with more caution: asthma, heat stroke, plague, pleurisy, Rocky Mountain spotted fever, smallpox, tick fever, tularemia, typhoid fever, and typhus fever.

(3) Patients recovered from one of the following diseases must be treated with much greater caution: acute nephritis, arthritis, diphtheria, encephalitis, phlebitis, poliomyelitis, and rheumatic fever. A much longer time should intervene between the time when the individual is afebrile and the time when he may start his exercise.

(4) In the following diseases the soldier is usually discharged, and no exercise program should be instituted in the Army hospital: coronary disease, endocarditis, myocarditis, and pulmonary tuberculosis unless arrested or healed.

**19. DISABILITY CLASSIFICATION.** **a.** A further subdivision is made according to disability, if any. In general, patients subject to medical treatment, as distinguished from surgical treatment, may perform any kind of activities in which the dosage is not too excessive. They may be considered as a "whole-



body group." This group will be further subdivided according to the classifications and subclassifications described in paragraph 17*b*. The general medical patients and neuropsychiatric patients are preferably placed in this group if the ward officer so prescribes. Surgical patients, if in sufficient number, should be further subdivided into groups according to the location of the surgical operation; for example: A, arm and shoulder group; B, hip and leg group; C, abdominal group; and D, back group. In small institutions, where it is necessary to combine groups, the instructor must take account of the individual's disability when prescribing or leading exercise.

**b.** Patients who are to be discharged from the service should, if possible, be segregated from those to be returned to duty. For these men the emphasis will be on activities that can be used in civilian life.

**20. PATIENT IDENTIFICATION.** To facilitate classification by the medical officer and to aid the physical training instructor, a color system is used to designate the subclasses. A triangle of colored cardboard should be placed in the card holder at the foot of the bed of Class 3 and 4 patients. A *red* card indicates that the patient is not to engage in any exercise, and that he is not yet a convalescent. An *orange* card indicates that he is to proceed with caution and may take a minimum of exercise. A *blue* card indicates that he may engage in a moderate degree of

exercise. A *green* slip permits him to engage in relatively strenuous exercise. The medical officer will need primarily to indicate five things: (1) class, (2) subclass, *a* (green), *b* (blue), *c* (orange), or no exercise (red); (3) type of disability, knee, abdominal, etc.; (4) type and dosage of remedial exercise, and (5) any special instructions. (For further information concerning this identification, see paragraph 47*c*.)

## **21. EXAMINATION AND RECLASSIFICATION OF PATIENTS.**

**a.** The patients or trainees must be examined at least once a week by the responsible medical officer to determine if they can progress to the next higher classification. Data from the physical tests and the impressions of the physical training instructors should be available to supplement the results of his clinical and functional examination.

**b.** The officer responsible for the reconditioning program, the trainee company commander, and the physical instructor should make rounds with the medical officer in Classes 1 and 2. In this manner they are able to coordinate their observations of each trainee with those of the medical officer. As it is impractical for the reconditioning personnel to accompany every ward officer in the evaluation of Class 3 and 4 patients, the nurse, or ward attendant, accompanying the ward officer conveys the necessary information to the reconditioning personnel.

**c.** If at any time any apparent deviation from the expected

physical response of any patient or trainee is noted by the reconditioning staff, it is to be reported to the responsible medical officer.

**d.** It is not necessary, nor always desirable, that every patient or trainee shall go through each class and subclass successively. He should be routed through the various classifications to graduation from the reconditioning program as rapidly as is consistent with his physical and mental welfare. For example, a patient who has been in Class 4a may proceed from 4a to 3a and, upon completion of his medical treatment, may be transferred first to 2a, and later to 1a, spending only 3 or 4 days or a week in each of the latter classifications. On the other hand, a medical patient may start with 4c, graduate to 3c, and pass successively through 3c, 3b, 3a, and thence through the Classes 2 and 1, spending a week in each of the subclassifications. Progress depends entirely upon the rate of healing and gain in physical strength of the individual patient.

**e.** Trainees should be transferred to Classes 2 and 1 once each week. If new trainees graduate into these classes daily, the instructors are constantly teaching the exercises to the newcomers. This disturbs the progression and continuity of the program. If the daily admittance of trainees to the Advanced Reconditioning Section is unavoidable, a special section or platoon should be provided for those who are admitted between classification periods. This special group can be given general

exercises until they can be assigned to the 2b group.

## **Section II. PATIENT ORIENTATION**

**22. RESPONSIBILITY.** **a.** The success of the reconditioning program is directly proportional to the manner in which patients respond to the activities. It is the task of all hospital personnel to interpret the program to patients so as to secure their complete understanding and cooperation.

**b.** The individual who can most effectively secure the cooperation of the patient is the ward surgeon. The best way to bring about a patient's whole-hearted participation in the physical reconditioning activities is for his medical officer to recommend them. Nurses and ward attendants must understand the purposes of the program and give constant support to it.

**c.** Much of the orientation will be done by the educational reconditioning staff, but the physical reconditioning instructors, whether regular staff members or patient instructors, must constantly interpret the program to the patients.

**23. METHODS.** A definite procedure should be followed in orienting patients to the reconditioning activities. This should begin at the earliest practicable moment. Material explaining the reconditioning activities should be made available to all patients. Movies are excellent media for interpreting the pro-



gram. Finally, the program should be explained to the patient by all who come into contact with him.

**24. DISCIPLINE.** The patient should be informed that during the execution of the program appropriate discipline must be maintained. Proper officer-enlisted man relationships should be maintained at all times, with the officers showing a high degree of interest in the welfare of the men. Where breaches of discipline occur, they should be dealt with promptly and in the same manner as in any military establishment. This applies especially to the Class 1 and 2 trainees.

**25. LEADERSHIP FOR CLASS 1 AND 2 PROGRAMS.** For Classes 1 and 2, instruction is carried on by trained noncommissioned officers assisted by qualified duty sergeants. Class 1 and 2 programs are supervised by the physical training or reconditioning officer.

### **Section III. INSTRUCTIONAL PERSONNEL**

**26. LEADERSHIP FOR CLASS 3 AND 4 PROGRAMS. a.** The Class 3 and 4 programs should be conducted to the extent possible by physical reconditioning noncommissioned officers who have been trained for this purpose. To make the fullest use of this personnel, the program should be staggered through-

out the day so that each instructor may teach from 6 to 8 hours, rotating from ward to ward.

**b.** The regular personnel may be supplemented by officer or noncommissioned officer patients. The patients assigned this responsibility must be carefully selected and trained. The training course should be thorough and no patient should be permitted to take over the leadership of a ward until he is adequately prepared. It is possible for a patient to care for several wards if the activity periods are staggered. Because of the indefinite status of this personnel, it is recommended that two patients be assigned to each ward, so that one can serve as the apprentice and take over the ward when the other leaves.

**c.** A final source of personnel is ward attendants. Because many ward attendants are not well suited by temperament and personality to this type of work, they must be carefully selected and thoroughly trained before they are used. One advantage of using trained ward attendants is that the man who can most closely observe the patient is responsible for his exercise.

**d.** When patients and ward attendants are used as instructors their work must be closely supervised by the physical reconditioning staff members. A rating chart which covers all important aspects should be used in this supervision. This chart will serve as a basis for improving the instruction.

**e.** In some hospitals the Class 4 exercises are broadcast over the intercommunication system. Such a practice is satisfactory

just so long as there is adequate supervision of the exercises on the ward.

#### **Section IV. SCHEDULES FOR COMPETITION**

**27. TOURNAMENTS.** a. Tournaments will stimulate interest in the physical reconditioning program and should be extensively used, particularly for Class 1 and 2 trainees. The constantly changing patient population makes essential the use of tournaments which can be quickly terminated. Where the number of competitors is not large this can be done without difficulty. With many competitors it is best to use an elimination tournament or several short round-robin tournaments with four to six teams each. The final winner of the round-robin tournaments can be determined either by an elimination tournament of the winners or by another short round-robin tournament of the winners of the first competition.

b. Some activities of a more informal nature, such as badminton, tennis, horseshoes, handball, etc., may be conducted outside the regular daily schedule, on either an elimination or a ladder tournament basis. The rules and methods of conducting tournaments are found in TM 21-205.

c. An effective method of increasing interest and participation in the athletic program is to utilize a scoring plan which will determine the organization with the best record in a variety

of sports. Such scoring plans are described in TM 21-205.

#### **Section V. EQUIPMENT**

**28. TYPES.** A wide variety of equipment is required for the physical reconditioning program. The athletic equipment includes that necessary for volleyball, softball, soccer, touch football, basketball, track and field, badminton, handball, horseshoes, table tennis, boxing, wrestling, and other sports. The gymnastic equipment includes horizontal and parallel bars, flying rings, horizontal ladder, stall bars, pulley weights, mats, medicine balls, Indian clubs, and climbing ropes. In addition, remedial equipment is necessary. (See ch. 9.)

**29. CARE.** It is important that the equipment be maintained in good condition. All hanging or suspended apparatus should be tested at least once a week. Loose equipment should be inspected as it is returned and repairs made immediately where indicated. Loose equipment should be locked up and issued only to patients and trainees authorized to use it.

**30. UNIFORM.** Where feasible, uniforms and rubber-soled shoes should be made available for trainees. Salvage fatigue trousers may be cut off and made into shorts. ,



## CHAPTER 3

### PROGRAMS FOR DIFFERENT CLASSES OF PATIENTS

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#### Section I. GENERAL

**31. CHARACTERISTICS OF PROGRAM.** a. The physical reconditioning program must start within the physiological tolerance of the patient and should become progressively more strenuous as the patient's tolerance increases. The program should never be pushed to the stage of exhaustion of the patient, even in Class 1.

b. A good physical exercise program alternates strenuous and less strenuous activities. The patient must have some strenuous activity (that is, strenuous relative to his condition at the time) in order to provide enough "overload" to insure progress in the development of strength and endurance. Strenuous activity cannot be continued over a long period, hence, periods of less vigorous activities should alternate with periods of more intense activity. As much as possible of this submaximal type of exercise should be in the form of sports and games which will be enjoyable as well as beneficial.

**32. PLANNING PROGRAM.** a. The first step in program planning is to outline the activities by classes and subclasses. After the program has been planned for Classes 4, 3, 2, and 1 successively, the adaptations for the subclasses within each of the classifications must be made. The final step is to formulate the seasonal, weekly, and daily programs.

b. The daily schedule of physical activities must be integrated with ward rounds and general professional care. Consideration must also be given to scheduling physiotherapy, occupational therapy, and other clinical appointments. Scheduling educational activities during the first 2 hours of the day will provide an adequate interval of time between breakfast and the exercise period.

c. At the beginning of the program, in each of the four classes, emphasis is placed upon the development of good form in the execution of the exercises. This allows more rest between activities and reduces the possibility of patients and trainees overextending themselves. As the activities are mastered and

the patients and trainees demonstrate greater capacity for work, the load should be steadily increased. This is done by increasing the *amount* of exercise and reducing the rest periods between activities.

d. The length of time any patient or trainee devotes to physical training activities should be subject to his medical officer's approval. In general, the *minimal* time for Class 4 patients to exercise is two 20- to 30-minute periods daily; Class 3 patients, 1 to 1½ hours; Class 2 trainees, 2 hours; and Class 1 trainees, 3 hours. This time is devoted to physical training activities and is exclusive of work therapy and military training activities such as dismounted drill.

## Section II. CLASS 4 PROGRAM

**33. USE OF BED EXERCISES:** a. **Exercise tolerance.** The Class 4 patient is able to take more severe exercise than is ordinarily thought to be possible as he is recumbent and the scheduled exercises use relatively limited muscle groups. Since he is reclining, the blood supply to his brain and medulla is completely adequate, so that he has little tendency to untoward sympathetic responses which might cause him to become nauseated or faint if he were standing. It is important that the Class 4 patient be given exercise to the point of tolerance within the limitation of his medical or surgical condition as this will prevent or retard his deterioration while in bed.

b. **Contraindications.** Many patients in Class 4 will be unable to participate in the complete exercise program and must be excluded from certain types of exercises. For example, an individual who has undergone an abdominal operation must avoid all exercises of the abdominal muscles. A man who has experienced an arthrotomy of the knee must not exercise the affected leg unless such exercise is prescribed by his ward officer. All other unaffected parts of the body, however, should be exercised to a considerable degree. Therefore alternative exercises have been provided in the Class 4 drill for such cases. The ward officer may prescribe physical conditioning by simply indicating the type of disability and the subclass; such as "Class 4c (blue), knee disability group of exercises." Exercises will then be conducted as described in paragraph 123.

**34. CONTENT OF CLASS 4 PROGRAM.** a. **Conditioning exercises.** Conditioning exercises are the best physical reconditioning activities available for bed patients and should compose the bulk of the program. These exercises have the advantage of being adaptable to the varying levels of condition and the different disabilities encountered. A set of conditioning exercises is recommended. (See par. 48.)

b. **Resistance exercises.** Resistance exercises in which a man resists the movement of one part of his body with another, or has another man resisting him, are excellent activities for

Class 4 patients. The resistance increases the dosage of the activity and thus increases its value. (See par. 53.)

**c. Remedial exercises.** In addition to the general exercises, the ward officer may give more specific prescriptions of exercises for affected parts. Such prescribed exercises should not be administered by personnel other than the physical therapy department unless so ordered. Remedial exercises should be taken frequently—they are often given once an hour from 9:00 A.M. to 11:00 A.M. and from 1:00 P.M. to 5:00 P.M. Remedial exercises are found in chapter 9.

**d. Exercises with apparatus.** Apparatus for physical training may be brought to the wards on a specially equipped cart. The Class 4 patient will then be able to undertake exercises with iron dumbbells, spring exercisers, or the spring-grip machine. Spring exercisers may be fastened to the bed in such a way that certain muscle groups can be put to heavier work.

**e. Games.** Very few games which involve active physical effort are available to the Class 4 patient. Darts, quoits, and bean bag throwing are examples of games that may be played by bed patients. Most suitable for Class 4 are the bedside games provided by the Red Cross.

### **Section III. CLASS 3 PROGRAM**

**35. CONTENT OF PROGRAM.** **a. Conditioning exercises.** The mainstay of the Class 3 program is conditioning

exercises. A set of these exercises which is more strenuous than the Class 4 drill is recommended. (See par. 49.)

**b. Resistance exercises.** Class 3 patients can, in addition to individual resistance exercises, undertake exercises in which they resist each other. This provides more dosage and added interest in the program. (See par. 54.)

**c. Remedial exercises.** Remedial exercises should form a prominent part of the program for Class 3 patients who require them. Many more remedial activities may now be prescribed as the patient has access to the remedial apparatus in the physical therapy department and the gymnasium. (See ch. 9.)

**d. Apparatus activities on ward.** Where it is impossible to go to the gymnasium but where apparatus is available, the apparatus may be brought to the wards in carts. The apparatus will include volley balls, heavy dumbbells, bar bells ranging up to 50 or 60 pounds, skipping ropes, spring exercisers, medicine balls, abdominal boards, Indian clubs, and light dumbbells. This cart should remain in the ward not more than a half hour. The patient engages in the various activities, as prescribed by the ward officer. The general principles of these types of activities will be discussed with the small group rotating activities in Classes 1 and 2.

**e. Games for use on wards.** Patients restricted to the wards may enjoy the games described in paragraphs 60 and 61.



**36. CONDUCT OF CLASS 3 PROGRAM.** As the Class 3 patient is ambulatory, he may leave the ward for his activity period. If suitable gymnasium or outdoor facilities are available, the Class 3 program should be conducted off the ward because a wider variety of activities is available. When necessary to carry on the activities on the ward, they may be conducted either separately or in conjunction with Class 4 activities. The drills for the Class 3 and 4 patients are integrated so that both groups may exercise at the same time. This conserves time and instructor personnel. Better results, however, are obtained if the two programs are conducted separately.

**37. POSTURE TRAINING.** When a patient becomes ambulatory, posture training should begin. Good posture is not simply a matter of standing erect. The patient should be taught to walk properly, to hold his feet in the proper position, particularly to avoid foot pronation. Foot strengthening exercises are indicated and should be included as part of the regular conditioning exercise program. (See pars. 124, 125.)

**38. INTEGRATION WITH CLASS 2 EXERCISES.** Many of the Class 3a patients are in as good condition as those of Class 2b but they are retained in the hospital wards because they are still under active treatment. Therefore it is desirable to com-

bine some of the work of the Class 3a and even Class 3b patients with that of some of the Class 2b trainees. Decisions as to the feasibility of this should be made jointly by the ward officer, the physical reconditioning officer, and the physical training instructor.

#### **Section IV. CLASS 1 AND 2 PROGRAMS**

**39. GENERAL.** a. The Class 2 trainee is still subnormal as to strength, endurance, and agility. The Class 1 trainee is almost fit for duty. There should be no fixed amount of time to progress through these classes and trainees will be sent to duty by the medical officer as soon as they demonstrate the required fitness.

b. It may be desirable to group these trainees according to their physical capacities. For example, those whose cardiovascular respiratory endurance is poor may be in one group practicing running, while those whose endurance is better will be in another group.

**40. CONTENT OF PROGRAM.** The type of activities engaged in by Class 2 and 1 trainees consist of the following:

a. **Large group activities.** (1) *Conditioning exercises.* Set drills are recommended for Class 2 and 1 trainees. (See

par. 51.) The drill for Class 2 trainees is progressively more strenuous than that for Class 3 patients. The drill for Class 1 trainees is that used for normal troops. (See FM 21-20.)

(2) *Guerrilla exercises, grass drills, and log exercises.* These are excellent conditioning activities and can be used to advantage to supplement the conditioning exercises. (See FM 21-20.)

(3) *Marching and running.* These activities assume increasing importance as the trainee approaches the time to return to duty. The running activities include obstacle course running in addition to wind sprints and cross-country running. The obstacle course is not a necessary adjunct to the reconditioning program but can be of value if it is properly constructed and administered. (See FM 21-20.) Two parallel courses should be constructed if feasible: one a "primary course" for Class 1b trainees; the other, a "standard course" for Class 1a trainees. The primary course is much less strenuous and difficult than the standard course. The wall to be scaled is 5 feet high on the primary course, but 7½ feet on the standard course. Special care should be taken to see that there is no racing over the course.

(4) *Sports and games.\** A large part of the physical reconditioning program should be devoted to sports and games.

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\* For rules and regulations of these activities see FM 21-20, TM 21-220, and TM 21-221.

The interest of the trainees in these activities will motivate their participation in the entire program. Tournament competition should be arranged in touch football, soccer, speedball, basketball, volleyball, cage ball, field handball, handball, badminton, bowling, and similar sports. Track and field, cross-country, and swimming meets are also popular.

(5) *Combatives.* See FM 21-20 and TM 21-221.

(6) *Relays.* See TM 21-221.

(7) *Swimming.* See FM 21-20.

**b. Small group activities.** (1) These activities are conducted in an indoor or outdoor gymnasium. The activities include rope skipping, rope climbing, light and heavy bag punching, Indian club swinging, medicine ball throwing, hand-to-hand contests, spring exercises, tumbling, weight lifting, and exercises on the horizontal ladder, horizontal bars, parallel bars, stall bars, pulley weights, abdominal boards, rowing machines, and exercise on the mat.

(2) Many of these activities may be going on simultaneously with the trainees rotating so that each man engages from 10 to 15 minutes in each of four or five activities. The activities of each trainee are prescribed by the reconditioning officer or instructor. There should be not more than four men on one type of activity. This requires careful planning and scheduling. For example, there may be schedules for men with

shoulder injuries—others for men with upper back injuries, with elbow injuries, with wrist injuries, hand injuries, etc. If 4 men work in one group and there are to be four different activities, there will be 16 men working simultaneously on all of these activities.

(3) The benefits of this type of rotating small group activities usually will be in direct proportion to the amount of intelligent planning and routing of the men that is put into it. Lack of careful planning will cause confusion and loss of patient interest.

**c. Remedial exercises.** There may be some Class 2 trainees who need to continue physiotherapy. The type of exercise which simply requires knee rockers, ankle discs, foot inversion treads, and similar apparatus is prescribed by the medical officer and carried out under the direction of the instructor by groups arranged according to disability.

**d. Work projects.** The work projects may well form a small part of the remedial program.

**e. Competitive activities.** (1) To add interest to the program the instructor should introduce competitive activities such as "Crows and Cranes," or a "monkey drill." The latter is a marching drill in which the men are to obey any command that is proper, but *not* to obey a command which cannot be properly executed according to military procedures. Whenever

a man commits an error he is eliminated. The last man left becomes the winner.

(2) Another type of "drill down" is used with conditioning exercises, where the instructor tries to confuse the men by doing an incorrect movement while giving a command to do another movement. For example, the instructor commands, "Arms sideward; MOVE," and at the same time, swings his arms sideward and upward to the overhead position. Any man who does not stop at the sideward position goes to the rear rank. This type of drill can be used for Class 3, 2, and 1 patients.

## Section V. PROGRAMS FOR NEUROPSYCHIATRIC PATIENTS

**41. OPEN WARD PATIENTS.** The physical reconditioning program for the open ward neuropsychiatric patient is somewhat similar to that recommended for the ordinary Class 2 trainee. The major differences are—

**a.** Somewhat less emphasis is placed on the strictly conditioning exercises. These patients will generally not be returned to combat duty and will not require a high degree of conditioning. There should, however, be some conditioning exercises given and these activities must be well motivated. Selected patients, after some training and experience, can lead the conditioning exercises under the supervision of the instructor.



b. Greater emphasis is placed on competitive sports and games organized into tournaments and meets than is usual for Class 2 trainees.

c. Emphasis should be decreased on running and long marches.

d. The tolerance for exercise will be low, and the progression in general will be slower than with the usual Class 2 trainee.

**42. CLOSED WARD PATIENTS.** Many closed ward patients will be unable to participate in the physical training program. Where the closed ward patient has been assigned to the program by the psychiatrist, the program is much the same as that for the open ward case, except that—

a. The games program must be simple because the closed ward patient seldom plays the more complicated games satisfactorily. Simple group games like volley ball, quoit tennis, and goal-hi, and individual games such as rope quoits, badminton, twenty-one, etc., are preferable. Careful supervision of the games played by these patients is mandatory.

b. Body contact sports are contraindicated.

c. As these patients have very little activity, they should be given conditioning exercises about 10 minutes twice a day.

d. Where the patient is completely noncooperative, it may be well, if he can be released from his room, to have him sit and watch the games. Some patients will frequently want to participate after several days of observation.

## CHAPTER 4

### CONDITIONING EXERCISES

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#### Section I. GENERAL

**43. TYPES OF CONDITIONING EXERCISES.** The term *conditioning exercises* as used in this manual refers to setting up exercises conducted without apparatus. They include—

- a. Set drills for Class 2, 3, and 4 patients.\*
- b. Resistance conditioning exercises for Class 3 and 4 patients.
- c. Conditioning exercises for cardiac patients.
- d. Water conditioning exercises.

**44. VALUE OF CONDITIONING EXERCISES:** Selected conditioning exercises are used for all classes of patients. They are employed primarily for developing strength and endurance and secondarily for increasing the range of motion in injured muscles or joints after the disability has healed.

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\* The drill for Class 1 trainees will be found in FM 21-20, when revised.

#### **45. LEADERSHIP IN CONDITIONING EXERCISES.\*\* a.**

With the exception of the water exercises, all the conditioning exercises are arranged in "set" drills. A "set" drill is one which exercises all important muscle groups of the body, and is to be repeated many times. A good exercise is a good exercise whether performed for the first time or for the hundredth time. The use of set drills eliminates the great waste of time associated with continually presenting and teaching new exercises. The instructor should require the patient to memorize the drills so that the conduct of the program may be facilitated. Each exercise of the set drills has a short name. After the exercises are learned they should follow one another very rapidly. The instructor calls out the next exercise by its name, puts the group in the proper starting position, and proceeds. If

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\*\* Before beginning preparation for teaching conditioning exercises, the instructor should read FM 21-20. That manual gives full directions for presenting conditioning exercises as well as the terminology used. The conditioning exercises given in this chapter will be conducted according to directions outlined in FM 21-20.

necessary, the instructor may demonstrate the exercise quickly to help the patients recall it.

**b.** During the first few meetings in Classes 1 and 2, the instructor stands in front of the group and besides directing the work, performs the exercises with the patients. After the exercises have been partially learned by the group, a patient may be substituted to set an example, to call out the name of the exercise, and to count the cadence. The instructor is thus free to move about as he pleases, give commands, make suggestions, and otherwise direct the group in an efficient manner.

**c.** In the beginning, each exercise is repeated only a specified number of times, especially for Classes 3 and 4. A short pause, not over 10 seconds, might be given after each exercise or after every two exercises for Class 1. For Classes 2, 3, and 4, this pause should be longer. After three or four exercise periods the number of repetitions is gradually increased and the rest periods gradually reduced in number and length. In Classes 3 and 4 there should not be too many repetitions of any one exercise, usually not over 12. Among Class 1 and 2 trainees, however, the repetitions should increase to a considerably larger number and usually the number will increase every 2 or 3 days. If the overload principle (par. 12) is applied, these drills will provide strenuous, progressive developmental exercise.

**d.** The counts for the various exercises should be given so that the last count is the number of the repetition. Thus, the

count would be, "1-2-3-1; 1-2-3-2; 1-2-3-3; 1-2-3-4; 1-2-3-5; .....," etc. All movements are four-count movements. This is an excellent method of keeping check on the progression.

**e.** All exercises should be executed in good form and with vigor. The instructor must set a good example, and he must insist upon the enthusiastic and accurate participation of the patients. This is accomplished more effectively by encouragement and good leadership than by reprimand.

**f.** In the beginning, exercises that are difficult to perform correctly, such as exercises for the correction of bad posture and exercises involving backward bending, must be taught until they are executed correctly.

**g.** When conducting resistance exercises, or partner pull-ups, pair patients according to height.

**46. PROGRESSION IN CONDITIONING EXERCISES.** Exercises may be made progressively more severe as follows:

**a. Adding to number of repetitions.** An exercise given 30 times is much more exacting than one repeated only 10 times.

**b. By increasing leverage of bending exercises.** This is generally accomplished by raising the position of the hands and arms. For example, if the man is to bend forward, the easiest position would be with the arms at the sides at the position of attention, or with the hands on the hips. The next more difficult position would be to bend with the arms in



a thrust position. The next more difficult position would be with the hands behind the head; next with the arms folded over the crown of the head, and the most difficult position would be with the arms overhead. With each successive movement of the arms upward, the center of gravity of trunk and arms is raised and the dosage of the exercise is increased.

**c. Increasing amplitude of movement.** This requires swinging the arms further, squatting further down, or bending further. The severity may be increased in bending exercises by adding several "bounces" in the bent position. In this position when the man comes to the end of the bend, he relaxes slightly, then bobs downward one or more times according to the directions.

**d. Altering cadence.** (1) The more rapid the cadence, other things being equal, the greater will be the dosage. As the limbs, trunk, or body as a whole move, they overcome not only the pull of gravity, but the inertia of the part. Doubling the rapidity of the movement increases the dosage approximately eight times.

(2) Occasionally, however, full, fast movements are easier than slower ones because the limbs or body bounce at the end of the movement, being stopped by the resistance of another part of the body. For example, it is easier to do fast, full knee bends than it is to do a knee bend first going down to a half knee bend position, then a full knee bend position, and

on the upward movement, stopping at the half knee position.

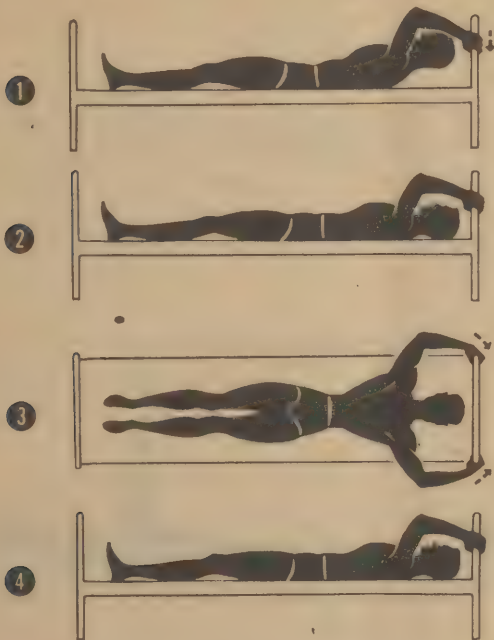
## Section II. CONDITIONING EXERCISES FOR CLASSES 4, 3, AND 2

**47. GENERAL.** **a.** The drills for Class 3 and 4 patients consist of 7 exercises. After being executed once, *all 7 are repeated immediately*, making a drill of 14 exercises. (See pars. 48 to 49.) The exercises selected cover the principal muscle groups of the body but unless they are repeated the dosage of activity is insufficient for strengthening the various muscle groups.

**b.** Since patients with specific surgical disabilities may not engage in certain of these exercises, alternative exercises are provided. One or the other of the two exercises can be executed unless the patient suffers multiple injuries. The patient should not be permitted to be inactive because of a disability; he should perform the alternative exercise if at all possible. Exercises that are alternates to the regular exercises are given under the same number, with the addition of "A" (for alternate). Thus, exercise 4A is the alternate for exercise 4 when the latter exercise cannot be done because of some disability. An alternate for exercises 4 and 4A would be numbered 4B.

**c.** Patients in subclass *c* (orange) should stop on each exercise after 4 repetitions (of 4 counts each). Patients in subclass *b* (blue) should stop after 8 repetitions. Patients in subclass *a* (green) should do 12 repetitions.

## Starting Position



## 48. CONDITIONING DRILL FOR CLASS 4. See table I.

## EXERCISE 1: RAISE AND PUSH

**Cadence.** Slow.

**Starting position.** Lying on back, hands grasping the sides of the head of the bed about 8 inches above the level of the mattress.

**Movement.**

(1) Push down toward the floor with the hands, pushing hard enough to lift head and shoulders slightly from the bed. Do not assist this movement with the abdominal or thigh flexor muscles. Do not bend the head forward.

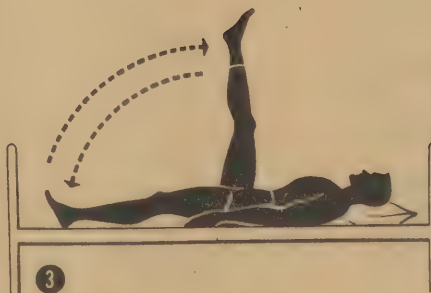
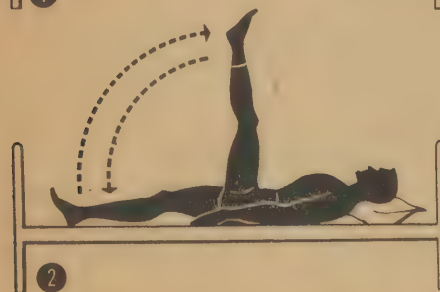
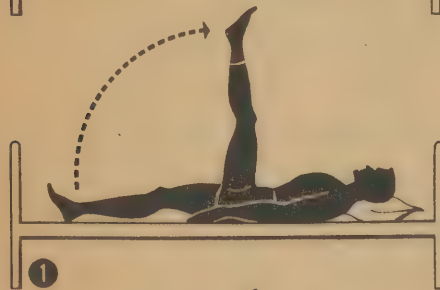
(2) Recover to starting position.

(3) Push with both hands overhead in a direction away from the feet, and at the same time pull the hands together inward toward the middle line of the bed.

(4) Recover to starting position.

The principal muscles used in this exercise are the shoulder muscles and those of the upper back which adduct the upper part of the shoulder blades (upper and middle trapezius and rhomboids). The other muscles of the arms and forearms are used secondarily.

## Starting Position



## EXERCISE 1A: ALTERNATE LEG RAISER

**Cadence.** Moderate.

**Starting position.** On back, feet together.

**Movement.**

- (1) Raise left leg upward to the vertical.
  - (2) Lower left leg and at the same time raise right leg to the vertical. Knees should not be bent.
  - (3) Lower right leg and at same time raise left leg to vertical.
  - (4) Lower left leg and at same time raise right leg to vertical.
- (On last *repetition* finish with both legs on bed.)

The principal muscles used in this exercise are those of the thigh flexors (ilio-psoas, rectus-femoris, and tensor fascia femoris). Secondly, the abdominal muscles are used to fix the pelvis.



**Starting Position****EXERCISE 2: LEG STRETCHER**

**Cadence.** Moderate to slow.

**Starting position.** On back with pillow doubled and placed under the knees, arms by side. Feet together.

**Movement.**

- (1) Straighten knees and point toes downward, forcibly resting knees on pillow; grip hands hard.
- (2) Recover to starting position, opening hands hard.
- (3) Straighten knees hard and raise toes, pushing forward hard with heels and gripping hands hard.
- (4) Recover to starting position, opening hands hard.

The principal muscles used in this exercise are those which extend the knees, and those which extend and flex the foot and hand. If disability to one foot or leg exists, this exercise should not be executed on that side.



Starting Position



1



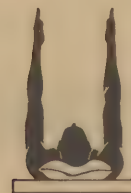
2



3



4



### EXERCISE 3: SHOULDER BLADE SQUEEZER

**Cadence.** Slow.

**Starting position.** On back, arms forward (towards ceiling).

**Movement.**

- (1) Swing arms sideward and backward, and press arms hard against the bed.
- (2) Relax slightly, and press again.
- (3) Repeat count (1).
- (4) Return to original position.

Starting Position

**EXERCISE 3A: CHEST RAISER****Cadence.** Moderate.**Starting position.** On back, arms by sides.**Movement.**

- (1) Raise chest forcibly and inhale deeply, press backward against bed with head and arms. At the same time, contract all of the back muscles and extend toes downward hard.
- (2) Recover to original position.
- (3) Repeat count (1).
- (4) Recover to starting position.

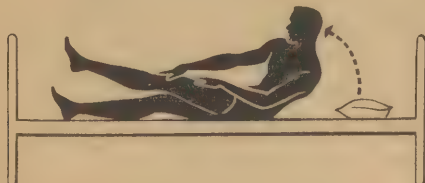




Starting Position



1



2



3



4

**EXERCISE 4: CURL AND TWIST****Cadence.** Moderate.**Starting position.** On back, arms by side, feet separated about 2 feet.**Movement.**

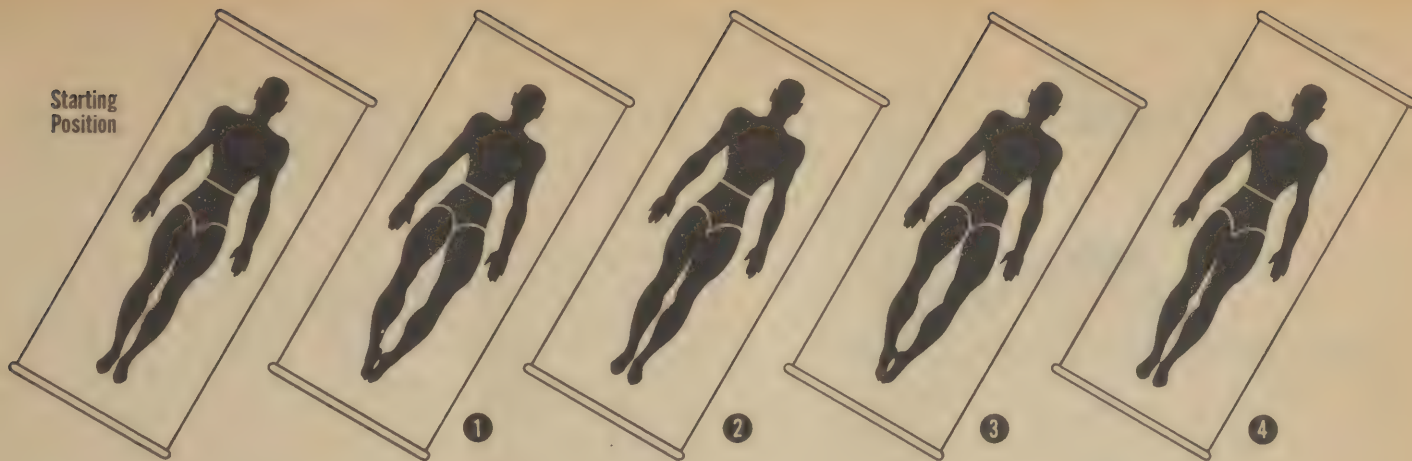
(1) Raise head and shoulders from bed, raising right shoulder the higher. Touch left knee with right hand, and at the same time raise left leg about 6 inches off bed.

(2) Recover to starting position.

(3) Repeat count (1) to other side.

(4) Recover to starting position.

The principal muscles used in this exercise are those of the abdomen and those which flex the thigh.

Starting  
Position**EXERCISE 4A: FOOT SUPINATOR****Cadence.** . Slow.**Starting position.** On back, arms by sides, toes pointed downward.**Movement.**

(1) Bend ankles inward until soles of feet are together and knees are very slightly bent; press soles together hard.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The principal muscles used in this exercise are those which supinate the feet, the muscles of the soles of the feet, and the adductors of the thighs. If the patient has undergone a recent abdominal operation, he should press his heels hard against the bed.

Starting Position



1



2



3



4

**EXERCISE 5: BRIDGE RAISER****Cadence.** Moderate to slow.**Starting position.** On back with knees drawn up and feet about 2 feet apart. Fists are pressed on pillow at either side of head, elbows are elevated, and forearms are alongside of head.**Movement.**

- (1) Raise trunk from bed, resting weight solely on head, fists, and feet. Hips should be raised until the body is approximately straight from shoulders to knees.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

The principal muscles used in this exercise are the extensors of the whole body, neck, back, hips, and hamstrings. The extensor muscles of the back of the shoulders are also exercised vigorously. If properly executed, this exercise does not contract the muscles of the abdomen.





## EXERCISE 5A: SPLIT AND CROSS

**Cadence.** Moderate to slow.

**Starting position.** On back, legs raised from the bed and separated widely, knees straight.

**Movement.**

- (1) Swing legs together and cross them as far as possible, left leg above right leg.
- (2) Recover to starting position with legs widely separated.
- (3) Swing legs together and cross them, right leg over left leg.
- (4) Recover to starting position. On last movement of last repetition, recover to position with legs extended on the bed.

The principal muscles used in this exercise are those of the abdomen and the flexors, abductors, and adductors of the thighs.



## EXERCISE 6: HIP SHRUGGER

**Cadence.** Slow.

**Starting position.** On back, hands behind head, knees fully bent, and feet about 18 inches apart.

**Movement.**

(1) Raise left hip from the bed and "shrug" it up towards the armpit on that side as though trying to bring top of hip bone under the armpit. (The hip movement is like raising one foot

from the ground while standing *with both knees straight*.)

(2) Recover to starting position.

(3) "Shrug" the right hip upwards toward the right armpit in a similar manner.

(4) Recover to starting position.

The principal muscles used in this exercise are the muscles of the sides of the abdomen (quadratus lumborum, external and internal obliques, and the erector spinae muscles on the side upon which the shrugging movement is made).



Starting Position



4

**EXERCISE 6A: KNEE DIP****Cadence.** Moderate to slow.**Starting position.** Prone on bed; arms at thrust, with fists resting on bed on either side of chest just below the line of the shoulders; and knees flexed.**Movement.**

- (1) Push downward with fists, raising the body in the ordinary push-up movement, but rest on knees rather than on feet. Body is straight from shoulders to knees.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

The principal muscles used in this exercise are the thigh flexors; the muscles of the abdomen; those on the backs of the arms (triceps), the anterior shoulders (anterior deltoid) and the anterior chest (pectoralis major); and those which pull the scapulae forward (serratus anterior).

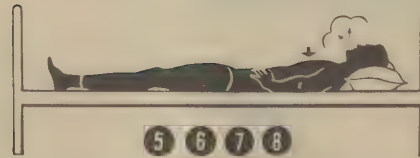


Starting Position

**EXERCISE 7: FOUR-COUNT BREATHER****Cadence.** Slow.**Starting position.** On back, hands on hips.**Movement.**

(1-2-3-4) Inhale on four counts, taking a deeper breath on each count. Usually the patient will have inhaled fully by the third count, but he should try to inhale further on the fourth count.

(5-6-7-8) Exhale in "waves" in four counts. Try to blow all of the air out on the seventh and eighth counts.



Starting  
Position

**49. CONDITIONING DRILL FOR CLASS 3.** These exercises are to be repeated as the Class 4 exercises were, but the sixth exercise will differ when given the second time. That given the first time is 6(1), the one given the second time is 6(2). (See table II.)

#### EXERCISE 1: NECK FIRM AND ON TOES

**Cadence.** Slow.

**Starting position.** Standing, fingers laced behind head.

**Movement.**

(1) Pull head and neck backward, raising chest high, straight-

ening upper back, and resisting forcibly with hands. Pull elbows backward, and rise high on toes.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The principal muscles used are those of the arms and shoulders, neck and upper back, and the calf. Men with arm or shoulder disabilities use the good arm. If both their arms are incapacitated, they execute the head, back, and on-toes movement without using their hands. A man with a neck disability will do as much of the movement as is prescribed.

**EXERCISE 2: SQUAT AND UP**

**Cadence.** Moderate.

**Starting position.** Hands on hips.

**Movement.**

- (1) Squat fully, placing hands on ground.
- (2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The principal muscles used are the extensors of the knees, the muscles of the buttocks, and secondarily, the extensors of the back. Men with any knee or hip disabilities should modify the movement as much as necessary by separating the feet and squatting principally on one leg, or by going only to a half squat position.

Starting  
Position







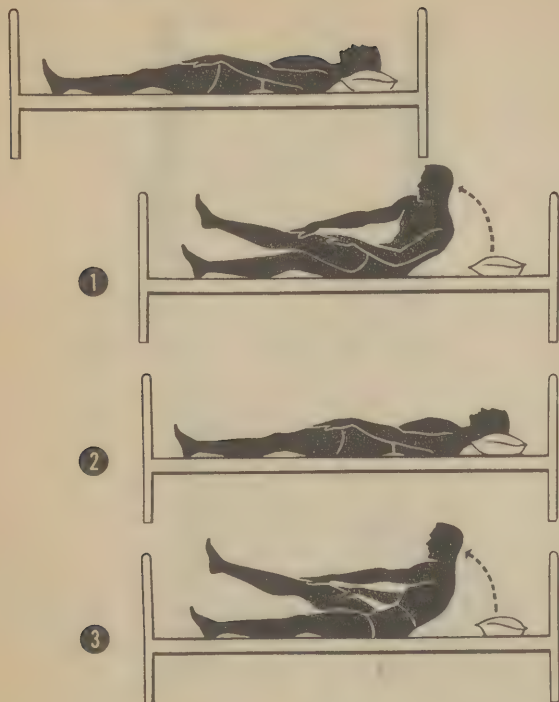
### EXERCISE 3: SHOULDER BLADE SQUEEZER

**Cadence.** Slow.

**Starting position.** Standing erect, feet together, arms forward.

#### **Movement.**

- (1) Swing arms sideward and backward as far as possible, palms up.
- (2) Relax slightly and swing arms backward again.
- (3) Repeat count (2).
- (4) Return to original position.

**Starting Position****EXERCISE 4: CURL AND TWIST**

**Cadence.** Moderate.

**Starting position.** On back, arms by side, feet separated about 2 feet:

**Movement.**

- (1) Raise head and shoulders from floor, raising right shoulder the higher and touching left knee with right hand. At the same time, raise left leg off floor about 6 inches.
- (2) Recover to starting position.
- (3) Repeat count (1) to other side.
- (4) Recover to starting position.

The principal muscles used in this exercise are those of the abdomen and those which flex the thigh. If it is impracticable to lie on the floor or ground, substitute the following:





## EXERCISE 4A: FRONT KICK

**Cadence.** Moderate.

**Starting position.** Erect, arms sideward, palms up, feet together.

### **Movement.**

(1) Raise left leg forward, with knee straight, until foot is approximately the height of the shoulder. At the same time, swing arms forward touching foot with hands. The right knee

may be somewhat bent.

(2) Recover to starting position.

(3) Repeat count (1) with right foot.

(4) Recover to starting position.

The muscles used in this exercise are primarily those of the abdomen and shoulders, and the thigh flexors. The muscles of the standing leg are also exercised. Those men who are unable to perform either exercise 4 or 4A, substitute the following:



#### EXERCISE 4B: STAIR CLIMBER

**Cadence.** Moderate.

**Starting position.** Erect.

**Movement.**

1) Lift left knee to height of hips and swing right arm for-

ward, then return to starting position. Inhale.

(2) Lift right knee to height of hips and swing left arm forward, then return to starting position. Continue inhaling.

(3) Repeat count (1). Exhale.

(4) Repeat count (2). Continue exhaling.

The muscles used in this exercise are primarily those of the legs, hips, and arms.



## EXERCISE 5: HIP RAISER

Starting  
Position**Cadence.** Moderate.**Starting position.** Back leaning rest, with buttocks on the ground.**Movement.**

(1) Raise hips with knees straight until hips are slightly above a line drawn from shoulders to heels.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The principal muscles used in this exercise are those of the hips, the extensors of the back, and the hamstrings on the back of the legs.

Starting  
Position



**EXERCISE 5A: BOBBER** (This exercise is used by men who have an arm or shoulder disability which prevents their resting on their hands in a back leaning rest.)

**Cadence.** Moderate.

**Starting position.** Side-straddle.

**Movement.**

(1) Bend forward with knees straight and touch ground between feet.

(2) Relax slightly and "bob" downward again, touching ground from 6 to 8 inches farther forward.

(3) Repeat count (2), touching ground still farther forward.

(4) Recover to starting position.

The muscles used in this exercise are principally those of the back, the backs of the hips, and the hamstrings of the legs. In addition to strengthening these muscles, this exercise tends to stretch and slightly lengthen the hamstrings and to make a man more flexible. *Patients with back disabilities should restrict the amplitude of the movements.*

**EXERCISE 6(1): SIDE BEND****Cadence.** Moderate.**Starting position.** Side-straddle, fingers laced behind head, chest high.**Movement.****(1)** Bend sideward left, keeping knees straight.**(2)** Recover to starting position.**(3)** Repeat count (1) to opposite side.**(4)** Recover to starting position.

The muscles used in this exercise are primarily those on the sides of the waist (oblique muscles of the abdomen, quadratus lumborum) and those on the convex side of the back. The thigh abductor muscles on the sides of the hips are also exercised strenuously.





### EXERCISE 6(2): STATIONARY RUN

**Cadence.** First slow, then fast, then slow.

**Starting position.** Erect, arms at thrust. Fists lightly clenched.

**Movement.**

Begin slowly, speed up somewhat raising knees to the height

of the hips. Run for a while at full speed raising knees forcibly. Then slow down. The total time spent should be from 30 seconds to 1 minute.

If it is impracticable to do the stationary run because of a leg disability, substitute hopping on the unaffected leg. The principal muscles used will be the same as in the stationary run, except that they will be confined to the active leg.



## EXERCISE 7: FOUR-COUNT BREATHER

**Cadence.** Slow.

**Starting position.** Standing erect, hands on hips.

**Movement.**

(1-2-3-4) Inhale on four counts, taking a deeper breath on each count. Usually the patient will have inhaled fully by the third count, but he should try to inhale further on the fourth count.

(5-6-7-8) Exhale in "waves" in four counts. Try to blow all of the air out on the seventh and eighth counts.



### 50. ADAPTATION OF CLASSES 3 AND 4 DRILLS TO DIFFERENT DISABILITIES.

The exercises described above for Classes 3 and 4 can, with their alternates, be adapted to varying physical conditions. Table I (Class 4) and table II (Class 3), which follow, apply the individual exercises to specific disabilities, showing which exercises are most beneficial, which are recommended, and which are contraindicated.

TABLE I

## ADAPTATION OF CLASS 4 DRILL TO DIFFERENT DISABILITIES

<b>KEY</b> ■ — Contraindicated ✓✓ — Most beneficial ✓ — May replace original exercise	D I S A B I L I T Y					
	Upper Extremity	Lower Extremity	Abdominal	Back	Disc	Pilonidal Cyst <i>Must be done in prone position</i>
1. RAISE AND PUSH	■	✓✓	✓✓	✓✓	✓✓	✓✓
1A. ALTERNATE LEG RAISER	✓✓	■	■	✓	■	■
2. LEG STRETCHER	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
3. SHOULDER BLADE SQUEEZER	■	✓✓	✓✓	✓✓	✓✓	✓✓
3A. CHEST RAISER	✓✓	✓	✓	✓	✓	REPEAT 3A
4. CURL AND TWIST	✓✓	✓✓	■	■	■	■
4A. FOOT SUPINATOR	✓	■	✓✓	✓✓	✓✓	✓✓
5. BRIDGE RAISER	■	■	✓✓	✓✓	■	■
5A. SPLIT AND CROSS	✓✓	✓✓	■	✓	✓✓	■
6. HIP SHRUGGER	✓✓	✓✓	✓✓	✓✓	■	■
6A. KNEE DIP	■	■	■	✓	✓✓	✓✓
7. FOUR COUNT BREATHES	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓

TABLE II

## ADAPTATION OF CLASS 3 DRILL TO DIFFERENT DISABILITIES

## KEY

- — Contraindicated  
 ✓✓ — Most beneficial  
 ✓ — May replace original exercise

## D I S A B I L I T Y

	D I S A B I L I T Y					
	Upper Extremity	Lower Extremity	Abdominal	Back	Disc	Pilonidal Cyst
1. NECK FIRM AND ON TOES	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
2. SQUAT AND UP	✓✓	Modified	✓✓	✓✓	✓✓	REPEAT 1
3. SHOULDER BLADE SQUEEZER	One Arm	✓✓	✓✓	✓✓	✓✓	✓✓
4. CURL AND TWIST	✓✓	✓✓	■	✓✓	■	■
4A. FRONT KICK	✓	✓	■	✓	■	■
4B. STAIR CLIMBER	■	■	✓✓	✓	✓✓	✓✓
5. HIP RAISER	■	✓✓	✓✓	✓✓	✓✓	■
5A. THE BOBBER	✓✓	✓	■	■	■	■
6(1). SIDE BEND	✓✓	✓✓	✓✓	✓✓	■	✓✓
6(2). STATIONARY RUN	✓✓	■	✓✓	✓✓	✓✓	✓✓
7. FOUR COUNT BREATHES	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓

\* Substitute exercise 4, Elbow Extension Press-up, paragraph 70. Placing of elbows forward or backward determines severity of dosage.



**51. CONDITIONING DRILL FOR CLASS 2.** Five repetitions of each of these exercises will be given the first day. Thereafter the number of repetitions are gradually increased each day until a maximum of 16 is reached.

#### EXERCISE 1: MODIFIED HIGH JUMPER

**Cadence.** Moderate to fast.

**Starting position.** Trunk leaning forward, knees slightly bent, feet separated about 12 inches, and arms raised backward.

**Movement.**

(1) Swing arms forward and upward executing a small jump

upward. Arms are raised to the height of the shoulders.

(2) Swing arms downward and backward and make a small jump upward.

(3) Repeat count (1).

(4) Repeat count (2).

The jump in this exercise is a very low jump, more like a "crow hop." If the trainee is in good condition and has no back or leg disabilities, on count (3) he may make a short jump upward as in the High Jumper in Class 1 exercises. (See FM 21-20.) The muscles used in this exercise are primarily those of the legs and back, and secondarily those of the shoulders.



**EXERCISE 2: TURN AND PUNCH**

**Cadence.** Moderate to slow.

**Starting position.** Feet in wide side-straddle position, arms to thrust.

**Movement.**

- (1) Turn trunk to left and bend forward over left leg, bending left knee. Make a punching or striking movement with the right fist outside of the left foot.
- (2) Turn trunk to right without straightening up, and punch

outside of right foot with left hand, returning right arm to thrust position, straightening left knee, and bending right knee.

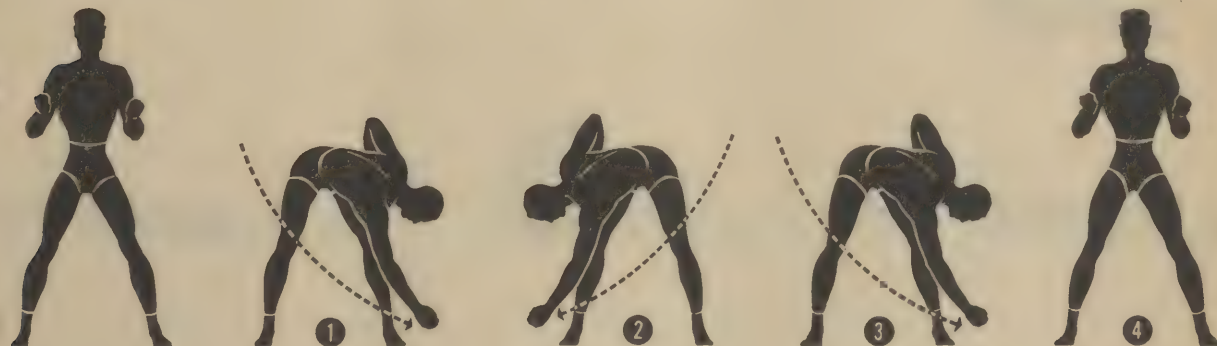
- (3) Turn trunk to left without raising up, and repeat punch with right hand outside of left foot.

- (4) Recover to starting position.

Repeat, starting on opposite side.

The muscles used in this exercise are primarily those of legs, back, and the sides of the abdomen. *Patients with back injuries or leg injuries of a nature which may make it difficult for them to execute this exercise vigorously, should restrict the amplitude of the movement as much as necessary.*

Starting  
Position



**Starting Position****EXERCISE 3: REACH AND TWIST**

**Cadence.** Slow.

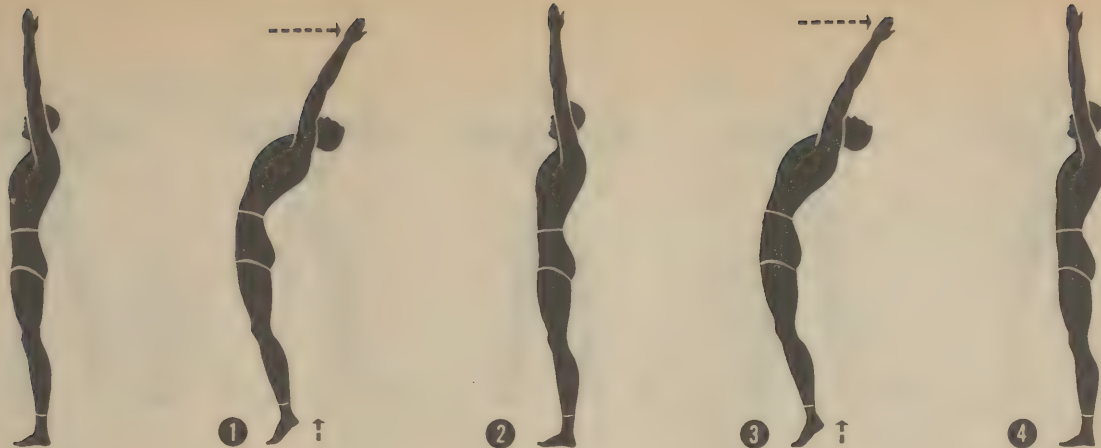
**Starting position.** On back, feet separated about 2 feet, hands on tops of thighs.

**Movement.**

- (1) Sit up, reaching across with right hand and touching toes on left foot.
- (2) Recover to starting position.
- (3) Repeat count (1), touching left hand to right foot.
- (4) Recover to starting position.

The muscles used in this exercise are primarily those of the abdomen and thigh flexors. If it is impracticable to lie on the ground for this exercise, substitute the following:

Starting  
Position



### EXERCISE 3A: REACHER-UPPER

**Cadence.** Very slow.

**Starting position.** Arms overhead, feet together.

**Movement.**

(1) Reach as high as possible upward and backward, raising the chest high, looking upward with head back, tightening the

muscles of the abdomen, and rising high on the toes.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The muscles used in this exercise are primarily those of the upper back, the abdomen, and the calves of the legs; and secondarily, those of the shoulders.



#### EXERCISE 4: BREAKING CHAINS

**Cadence.** Slow.

**Starting position.** Erect, elbows out horizontally at side, hands in front of shoulders, palms down, and fists clenched.

**Movement.**

(1) Pull elbows back hard as though trying to break a chain

held between the two hands.

(2) Relax tension slightly and then pull arms backward again without returning to original position.

(3) Repeat count (2).

(4) Recover to starting position.

The muscles used in this exercise are primarily those which retract the shoulders backward.



**Starting Position****EXERCISE 5: ROWING EXERCISE**

**Cadence.** Slow to moderate.

**Starting position.** On back, arms extended over head, feet together.

**Movement.**

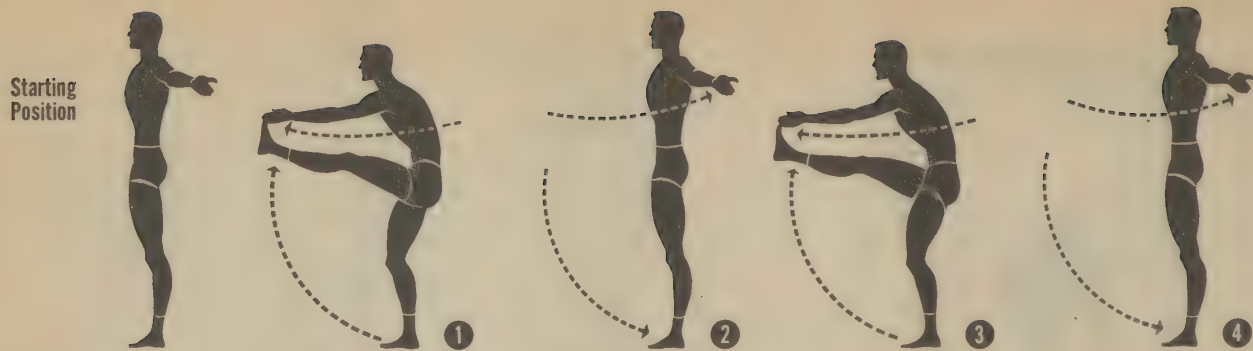
(1) Sit up and at the same time bend knees sharply; lean forward, thrusting or swinging arms forward to a rowing position. Knees are together and against the chest, feet are flat on ground, and heels close to the buttocks. Arms are extended forward.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Repeat count (2).

The muscles primarily used in this exercise are the abdominal and thigh flexors. Those secondarily used are the hamstrings, quadriceps of the legs, and the shoulder muscles. *Patients not able to bend as far forward as described must restrict the amplitude of the movement as much as necessary. If it is impracticable to lie on the ground for this exercise, substitute the one following:*



## EXERCISE 5A: FRONT KICK

**Cadence.** Moderate.

**Starting position.** Erect, arms sideward, palms up, feet together.

**Movement.**

(1) Raise left leg forward with knee straight until foot is approximately the height of the shoulder. At the same time,

swing arms forward touching foot with hands. The right knee may be somewhat bent.

(2) Recover to starting position.

(3) Repeat count (1) with right foot.

(4) Recover to starting position.

The muscles used in this exercise are primarily those of the abdomen and shoulders, and the thigh flexors. The muscles of the standing leg are also exercised.

Starting Position



1



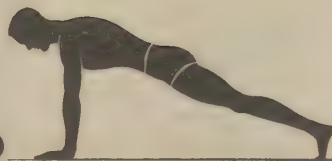
2



3



4

**EXERCISE 6: PUSH-UPS****Cadence.** Moderate or at will.**Starting position.** Front leaning rest.**Movement.**

- (1) Bend elbows and touch chest to ground, keeping body straight.
- (2) Straighten elbows, raising body to straight line.
- (3) Repeat count (1).
- (4) Recover to starting position.

The muscles used in this exercise are primarily those which extend the elbows and which move the upper arms forward, namely, the triceps and the anterior deltoid. The abdominal muscles are also strongly exercised, as are the extensor muscles of the knee. The muscles which pull the shoulder blades forward are also exercised. If, because of an upper extremity injury or other disability, the trainee cannot do this exercise, the following may be substituted:

Starting  
Position



## EXERCISE 6A: PUSH-DOWNS

**Cadence.** Slow.

**Starting position.** Erect.

**Movement.**

(1) Turn arms outward forcibly until back of hands are backward and upward behind the hips. Keeping elbows straight,

push heels of hands downward as hard as possible toward the medial line.

(2) Relax and recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

The muscles exercised are the shoulder retractors, the external shoulder rotators, and the elbow extensors.



**EXERCISE 7: SQUAT SWING-UP****Cadence.** Moderate.**Starting position.** Erect, arms overhead, feet apart about 1 foot.**Movement.**

- (1) Drop to a full squatting position with fingers on ground between feet.
- (2) Return to original position with a forward upward swing

of the arms, accompanied by a very forcible chest lift.

(3) Repeat count (1).

(4) Recover to starting position.

The muscles used in this exercise are the extensors of the thighs and hips and secondarily, the back muscles and the posterior muscles of the shoulders.

If, because of a disability of a lower limb, it is difficult for the patient to execute this exercise correctly, he should be instructed to separate his legs farther and squat only part way

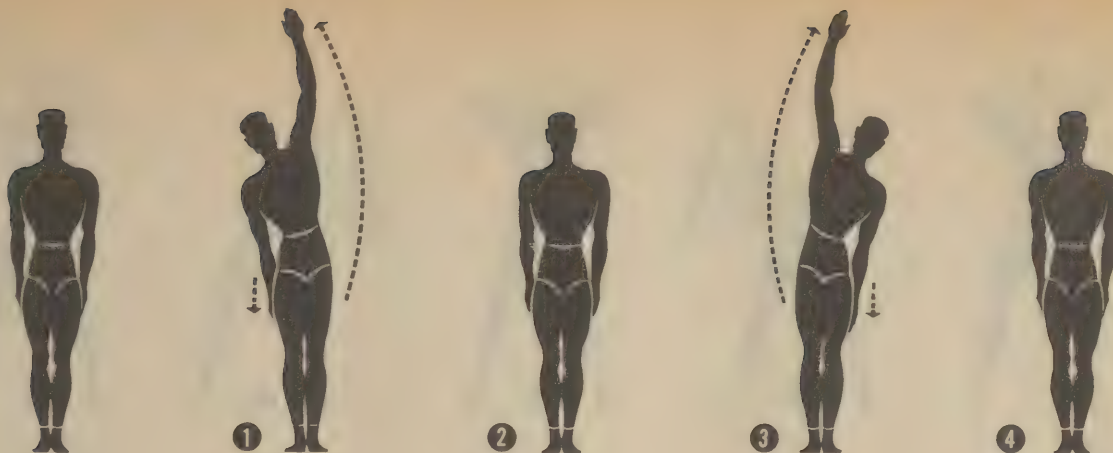


Starting Position

**EXERCISE 8: V-UPS****Cadence.** Slow.**Starting position.** Resting on back on ground. Arms are at an angle of about 45 to 60 degrees from sides and palms are down.**Movement.**

- (1) Sit up and at the same time raise legs with knees straight until trunk and legs form a V. Hands remain on the ground.
- (2) Relax slightly, then contract abdominal muscles and execute the V movement again.
- (3) Repeat count (2).
- (4) Recover to starting position.

The muscles used in this exercise are primarily those of the abdomen and the thigh flexors. This is a strenuous exercise. If lying on the ground is impracticable or the exercise is too strenuous, substitute the following:

Starting  
Position**EXERCISE 8A: "HOW" (Indian greeting)****Cadence.** Moderate to slow.**Starting position.** Erect.**Movement.**

(1) Swing left arm diagonally forward and sideward to overhead position. At the same time, looking upward and raising

chest high, bend trunk backward diagonally to the right and backward, and slide right hand down the back of the right thigh. Stretch high and backward with left hand.

(2) Recover to starting position.

(3) Repeat to opposite side.

(4) Recover to starting position.

Muscles used in this exercise are primarily those of the upper back, the back of the shoulders, and those of the abdomen.



## EXERCISE 9: SIDE BEND

**Cadence.** Moderate.

**Starting position.** Side-straddle, fingers laced behind head, chest high.

**Movement.**

(1) Bend sideward left, keeping knees straight.

(2) Recover to starting position.

(3) Repeat count (1) to opposite side.

(4) Recover to starting position.

The muscles used in this exercise are primarily those on the sides of the waist (oblique muscles of the abdomen, quadratus lumborum) and those on the convex side of the back. The thigh abductor muscles on the sides of the hips are also exercised strenuously.



## EXERCISE 10: THE BOBBER

**Cadence.** Moderate.

**Starting position.** Side-straddle.

**Movement.**

(1) Bend forward with knees straight and touch ground between feet.

(2) Relax slightly and "bob" downward again, touching

ground from 6 to 8 inches farther forward.

(3) Repeat count (2), touching ground still farther forward.

(4) Recover to starting position.

The muscles used in this exercise are principally those of the back, the backs of the hips, and the hamstrings of the legs. In addition to strengthening these muscles, this exercise tends to stretch and slightly lengthen the hamstrings and to make a man more flexible. *Patients with back disabilities should restrict the amplitude of the movements.*

Starting  
Position



Starting  
Position**EXERCISE 11: STATIONARY RUN**

**Cadence.** First slow, then fast, then slow.

**Starting position.** Erect, arms at thrust. Fists lightly clenched.

**Movement.**

Begin slowly, speed up somewhat raising knees to the height

of the hips; run for awhile at full speed raising knees forcibly, then slow down. The total time spent should be from 30 seconds to 1 minute.

The muscles used in this exercise are primarily those of legs, hips, and arms, though the muscles of the whole body are used secondarily.

**EXERCISE 12: STAIR CLIMBER**

**Cadence.** Moderate.

**Starting position.** Erect.

**Movement.**

(1) Lift left knee to height of hips and swing right arm forward, then return to starting position. Inhale.

(2) Lift right knee to height of hips and swing left arm forward, then return to starting position. Continue inhaling.

(3) Repeat count (1). Exhale.

(4) Repeat count (2). Continue exhaling.

The muscles used in this exercise are primarily those of the legs, hips, and arms.

Starting  
Position



### Section III. RESISTANCE CONDITIONING EXERCISES

**52. GENERAL.** **a.** In most of the exercises below, one man resists the movements of the other, thus both get considerable exercise. Because each man gets exercise, the repetitions should be from one-half to two-thirds as many as ordinarily given in a conditioning drill. If 16 repetitions were used where the man exercised by himself, 8 or 10 are given in this type of drill.

**b.** Pair the Class 3 men, first according to height, secondly according to subclasses (a Class 3c man is paired with another Class 3c). One man stands behind the other. The one doing the exercise first is called *A*; the one who resists is *B*. After *A* finishes, they reverse positions.

**c.** This type of drill can be substituted for the regular exercises from time to time, ordinarily not more than twice a week. However, it may be used more often if preferred by a group. The difficulty is that Classes 4 and 3 resistance drills are not geared so that they can be given at the same time. Besides, Class 4 men cannot assist each other since they are lying in bed and will have to be exercised by Class 3 men.

**d.** Resistance exercises may be done individually or in a group. If in a group they may be done in cadence or at will.

**53. RESISTANCE DRILL FOR CLASS 4.** This drill may be given either by a ward master to one patient at a time or by Class 3 patients to Class 4 patients. Not all exercises are partner resistance exercises.

#### EXERCISE 1: PULL IN ABDOMEN

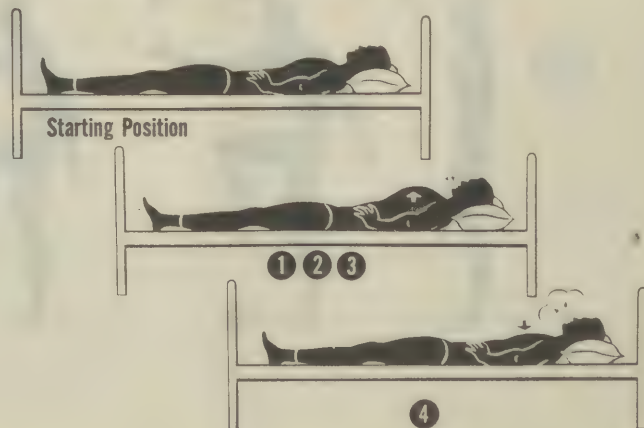
**Cadence.** Moderate to slow.

**Starting position.** On back, hands on hips.

**Movement.**

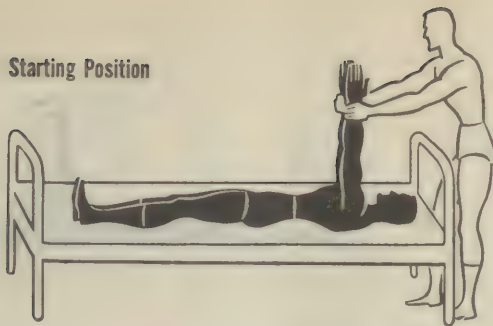
(1-2-3) Pull abdomen in and at the same time raise chest. Hold this position for about three slow counts.

(1) Return to starting position.

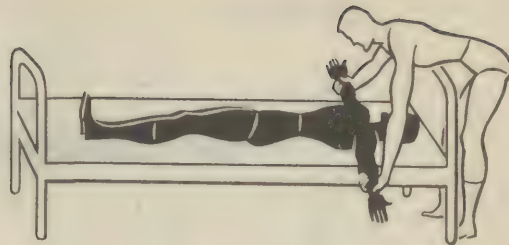




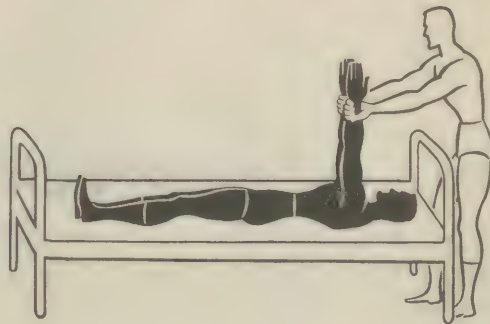
Starting Position



①



②



## EXERCISE 2: ARMS SEPARATED AND INWARD

**Cadence.** Slow.

**Starting position.** *A* on back, arms forward in relation to his chest. *B* grasps the outside of *A*'s wrists.

**Movement.**

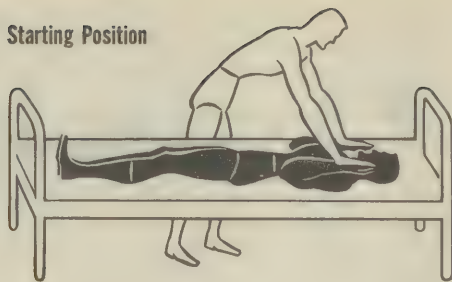
(1) *A* spreads arms, trying to swing them horizontally to the side so that his upper arms are against the bed. *B* resists this movement enough to make it difficult.

(2) *B* grasps inside of *A*'s wrists and resists his efforts to return to starting position.

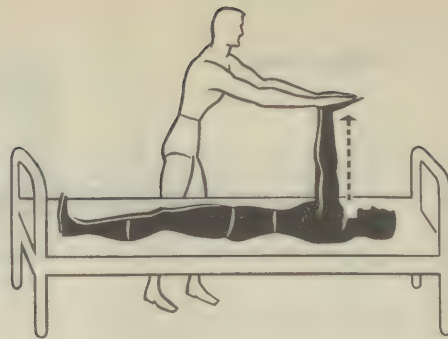
(3) Repeat count (1).

(4) Repeat count (2).

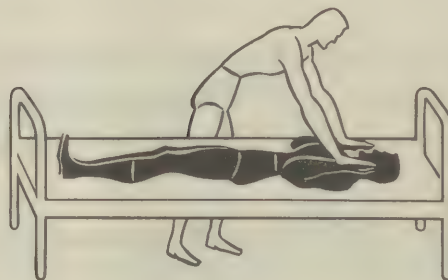
Starting Position



1



2



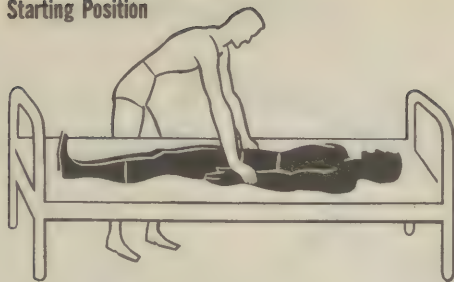
### EXERCISE 3: ARMS THRUSTING FORWARD

**Cadence.** Slow.

**Starting position.** *A* on back, hands by shoulders, elbows flexed, palms up. *B* places palms upon *A*'s hands.

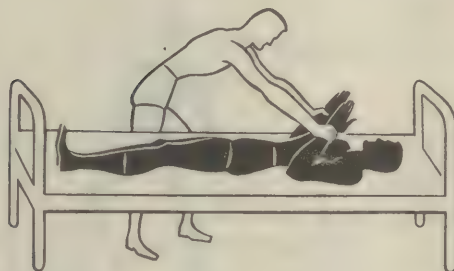
**Movement.**

- (1) *A* thrusts arms forward. *B* resists.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

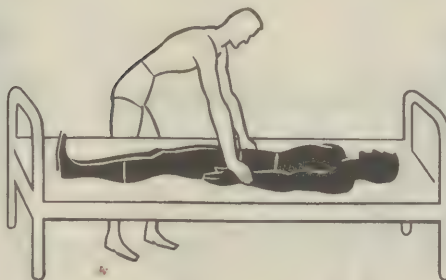
**Starting Position****EXERCISE 4: FLEXING ELBOWS****Cadence.** Slow.**Starting position.** *A* on back, arms by side. *B* grasps *A*'s wrists.**Movement.**

- (1) *A* flexes elbows, *B* resists.
- (2) *A* returns to starting position as *B* resists.
- (3) Repeat count (1).
- (4) Repeat count (2).

1



2



## EXERCISE 5: LEG-QUARTER NELSON

**Cadence.** Moderate to slow.

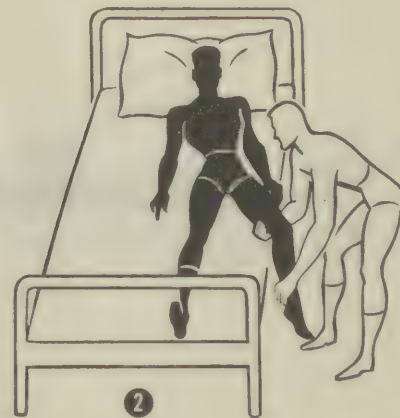
**Starting position.** *A* lies on back with left leg hanging over side of bed. *B*'s right forearm is under *A*'s left knee and his left hand is on *A*'s left ankle.

### Movement.

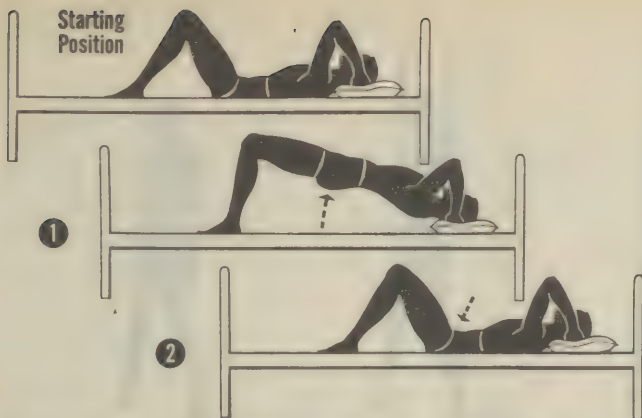
- (1) *A* extends left knee from hanging position to straight.
- B* resists enough to make it difficult.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total repetitions with each leg.

Starting  
Position







**EXERCISE 6: WRESTLER'S BRIDGE** (This is not a resistance exercise.)

**Cadence.** Moderate to slow.

**Starting position.** On back, feet drawn up about a foot below hips, knees bent slightly farther than a right angle, fists clenched and placed on pillow by side of head, elbows forward.

**Movement.**

- (1) Raise hips from bed, resting weight on fists, head, and feet.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

## EXERCISE 7: FOUR-COUNT BREATHER

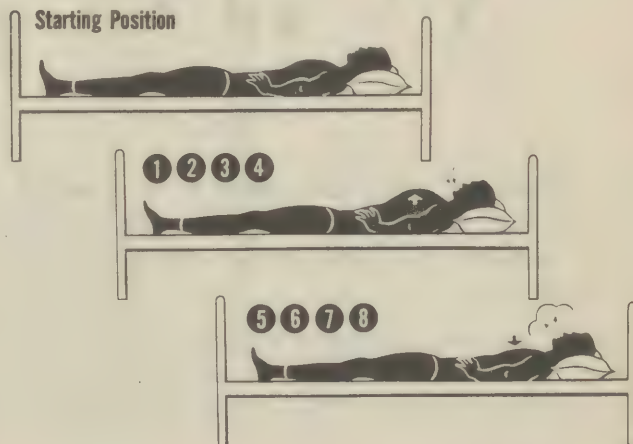
**Cadence.** Slow.

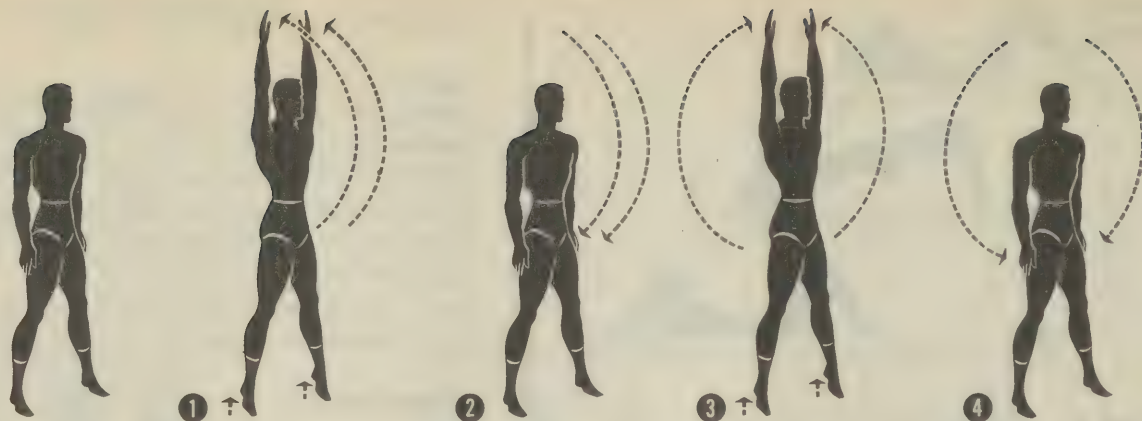
**Starting position.** On back, hands on hips.

**Movement.**

(1-2-3-4) Inhale on four counts, taking a deeper breath on each count. Usually the patient will have inhaled fully by the third count, but he should try to inhale further on the fourth count.

(5-6-7-8) Exhale in "waves" in four counts. Try to blow all of the air out on the seventh and eighth counts.



Starting  
Position

**54. RESISTANCE DRILL FOR CLASS 3.** a. This Class 3 drill, like drills without resistance, is made up of a small number of exercises. *The whole drill should be repeated after being given once.*

b. Not all of the exercises in this drill are resistance exercises. Whenever an individual exercise occurs, both men execute it simultaneously. This is true of the first, fourth, and eighth exercises.

**EXERCISE 1: FORE-UP, SIDE-UP** (Not a resistance exercise.)

**Cadence.** Moderate to fast.

**Starting position.** Standing erect, feet parallel and 1 foot apart.

**Movement.**

- (1) Swing arms fore-upward and rise high on toes.
- (2) Recover to starting position.
- (3) Swing arms side-upward and rise high on toes.
- (4) Recover to starting position.

**EXERCISE 2: A SQUAT, B STAND**

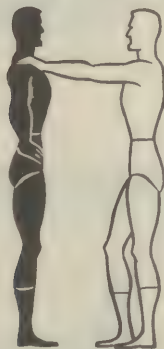
**Cadence.** Moderate.

**Starting position.** *A* and *B* standing face to face, *A* erect with hands on hips, *B* erect with one foot advanced. *B*'s hands are on *A*'s shoulders.

**Movement.**

- (1) *B* bends forward and presses down on *A*'s shoulders as *A* squats down with feet separated and heels on floor.
- (2) *A* straightens up while *B* presses hard on his shoulders to resist. *B* straightens up at the same time but continues pressure until they both recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Starting  
Position



1



2





### EXERCISE 3: SIDE BEND

**Cadence.** Moderate.

**Starting position.** *A* standing in side-straddle position with fingers laced behind head. *B* standing in side-straddle position behind *A* with left hand on *A*'s left arm and right hand on *A*'s right arm, just above his elbows.

#### **Movement.**

(1) *A* bends sideward left and *B* resists with his left hand to make it more difficult.

(2) *A* returns to starting position and *B* resists with right hand.

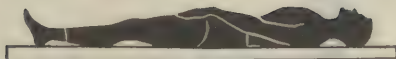
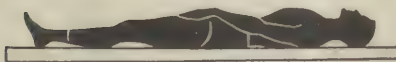
(3) *A* bends sideward right and *B* resists with right hand to make it more difficult.

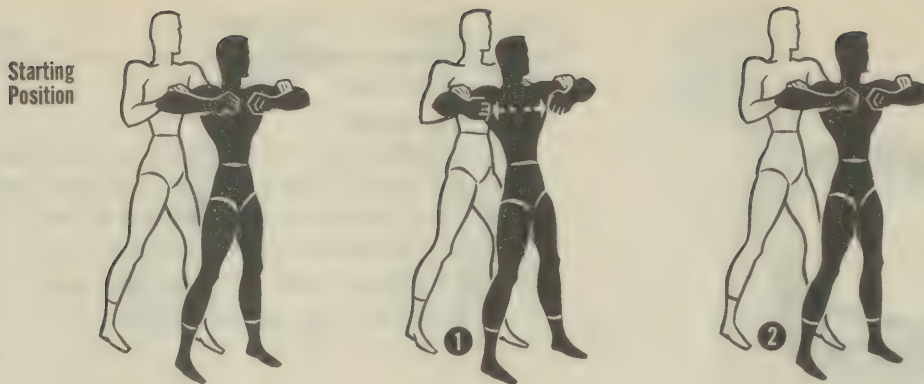
(4) *A* returns to starting position and *B* resists with left hand.



**EXERCISE 4: CURL AND TWIST** (Not a resistance exercise.)**Cadence.** Moderate.**Starting position.** On back, arms by side, feet separated about 2 feet.**Movement.**

- (1) Raise head and shoulders from bed, raising right shoulder the higher. Touch left knee with right hand, and at the same time raise left leg about 6 inches off bed.
- (2) Recover to starting position.
- (3) Repeat count (1) to the other side.
- (4) Recover to starting position.

**Starting Position****1****2****3****4**



### EXERCISE 5: BREAKING CHAIN AGAINST RESISTANCE

**Cadence.** Slow.

**Starting position.** *A*'s elbows raised horizontally to side and fully flexed in front of upper arm, fists clenched and in front of upper arms. *B*'s hands placed on back of *A*'s elbows. *A* leans back from 1 to 2 feet. *B* stands with one foot braced behind the other.

### **Movement.**

- (1) *A* moves elbows backward hard against resistance, making a pulling motion with fists as though breaking a chain. The position is held about 2 or 3 seconds.
- (2) *A* relaxes arms and repeats count (1).
- (3) Repeat count (2).
- (4) Recover to starting position.

**EXERCISE 6: PARTNER ROWING****Cadence.** Moderate.**Starting position.** *A* and *B* sit on floor facing each other with legs apart and soles of feet touching. They are clasping hands.**Movement.**(1) *A* bends trunk backward, *B* resists but bends his trunk forward.(2) *B* bends trunk backward, *A* resists but bends his trunk forward.

(3) Repeat count (1).

(4) Repeat count (2).

**Starting  
Position**

Starting  
Position



### EXERCISE 7: STATIONARY RUN

**Cadence.** First slow, then fast, then slow.

**Starting position.** Erect, arms at thrust. Fists lightly clenched.

**Movement.** Begin slowly, speed up somewhat raising knees

to the height of the hips. Run for awhile at full speed raising knees forcibly, then slow down. The total time spent should be from 30 seconds to 1 minute.

*Repeat above drill (exercises 1 to 7), substituting exercise 8 below for exercise 7.*

**EXERCISE 8: STAIR CLIMBER** (Not a resistance exercise.)**Cadence.** Moderate.**Starting position.** Erect.**Movement:**

(1) Lift left knee to height of hips and swing right arm for-

ward, then return to starting position. Inhale.

(2) Lift right knee to height of hips and swing left arm forward, then return to starting position. Continue inhaling.

(3) Repeat count (1). Exhale.

(4) Repeat count (2). Continue exhaling.





## Section IV. EXERCISES FOR CARDIAC PATIENTS

**55. GENERAL.** **a.** The patient with heart disease may not be exercised unless his ward surgeon so prescribes. When classified as being ready for exercise these patients are started with the Class 3c cardiac drill. When they have progressed sufficiently the Class 3b drill may be substituted. The medical officer in all cases, prescribes the number of repetitions of each exercise. Both the Class 3c and Class 3b drills should be administered twice a day.

**b.** As the condition of the patient improves, slow walking should be added. The distance must be prescribed by the medical officer. Later, these patients may participate in games which are appropriate for Class 4 and Class 3 patients, and which have been approved by the medical officer.

**c.** When patients are sufficiently recovered to be classified as Class 3a they are included in the regular 3a program. The games should be restricted to Class 3 games.

**d.** Patients who have recovered from diseases such as rheumatic fever or severe diphtheria in which there is a presumption of damage even though there are no signs or symptoms of cardiac impairment, when ready for exercise, should be started with the cardiac group and transferred to the normal group only when it is clear that this is indicated.

**e.** It is important that medical officers acquaint themselves

with the various levels of programs to the end that they will prescribe such programs in accord with the increasing tolerance of the patient.

## 56. CONDITIONING EXERCISE FOR CLASS 3b CARDIAC PATIENTS.

### EXERCISE 1: BREATHE AND CONTRACT

**Cadence.** Slow.

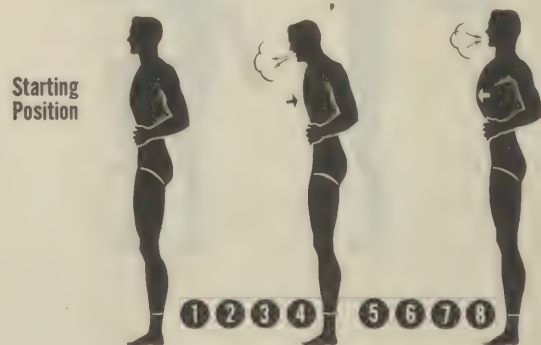
**Starting position.** Standing, hands on abdomen.

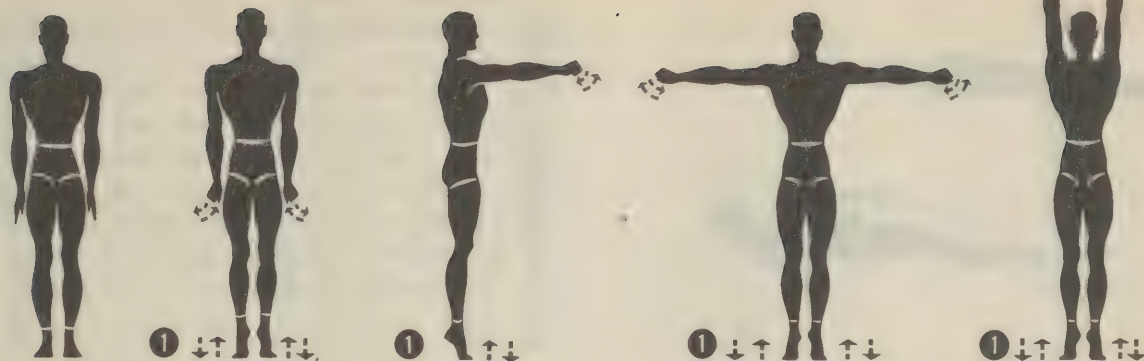
**Movement.**

(1-2-3-4) Exhale in four counts, drawing out more each time.

(5-6-7-8) Inhale on four counts, attempting to inhale more on each count.

Repeat 10 times.



Starting  
Position**EXERCISE 2: GRIP AND STRETCH****Cadence.** Moderate to fast.**Starting position.** Attention.**Movement.**

(1) With arms downward, clench fist tightly and rise high on toes.

(2) While extending fingers, lower heels to the floor.

(3) Repeat count (1).

(4) Recover to starting position.

Same, arms forward, arms sideward, and arms upward. Four to eight repetitions in each position. Cadence is counted in each position.

**Starting Position****EXERCISE 3: KNEE PULLER**

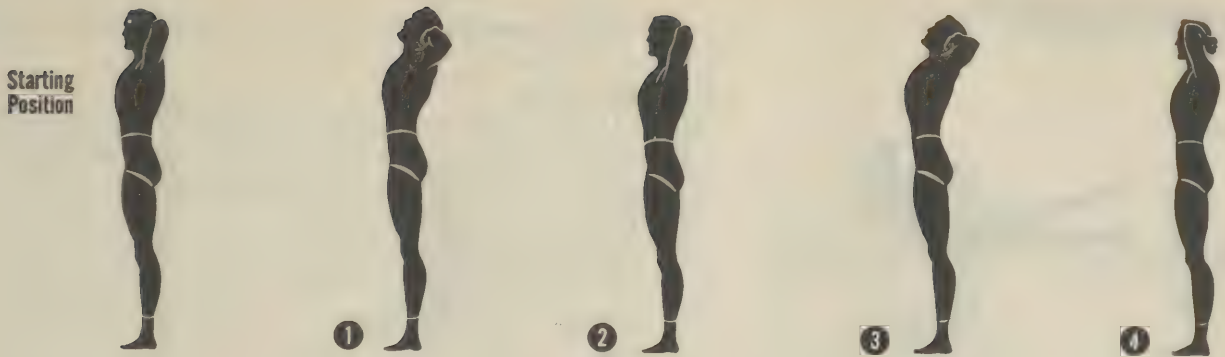
**Cadence.** Moderate to slow.

**Starting position.** On back, at attention.

**Movement.**

- (1) Raise left knee up towards the chest, grasping the leg below the knee with both hands and pulling knee hard up to chest, at the same time exhaling deeply.
- (2) Recover to starting position and inhale.
- (3) Repeat count (1) with opposite leg.
- (4) Recover to starting position and inhale.

From 10 to 15 repetitions.



**EXERCISE 4: NECK FIRM**

**Cadence.** Moderate to slow.

**Starting position.** Erect, fingers laced behind head.

**Movement.**

(1) Raise chest high, pulling head backward against resistance

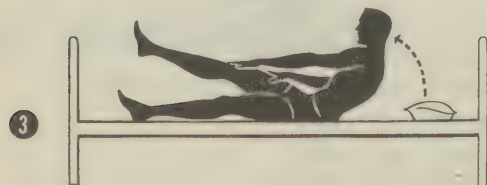
of hands, keeping elbows back, bending upper back backward slightly, inhaling.

(2) Recover to starting position and exhale.

(3) Repeat count (1).

(4) Repeat count (2).

From 10 to 15 repetitions.



## EXERCISE 5: CURL AND TWIST

**Cadence.** Moderate.

**Starting position.** On back, arms by side, feet separated about 2 feet.

**Movement.**

(1) Raise head and shoulders from bed, raising right shoulder the higher. Touch left knee with right hand. At the same time, raise left leg off bed about 6 inches.

(2) Recover to starting position.

(3) Repeat count (1) to other side.

(4) Recover to starting position.

From 6 to 10 repetitions.



Starting  
Position



1



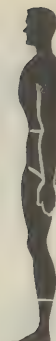
2



3



4



## EXERCISE 6: KNEE BEND AND CURL

**Cadence.** Slow.

**Starting position.** Attention.

**Movement.**

(1) Bend knees to full knee bend position and at the same

time flex elbows forward. Hands are just in front of shoulders.  
Exhale on downward movement.

(2) Recover to starting position and inhale.

(3) Repeat count (1).

(4) Repeat count (2).

From 6 to 10 repetitions.

Starting Position

**EXERCISE 7: PRONE LEG RAISING****Cadence.** Slow.**Starting position.** Prone, head supported on hands, and elbows flexed.**Movement.**

- (1) Raise left leg backward with knee straight.
- (2) Recover to starting position.
- (3) Raise right leg backward.
- (4) Recover to starting position.

From 8 to 10 repetitions.



## EXERCISE 8: TURN AND BEND

**Cadence.** Moderate.

**Starting position.** Side-straddle, arms sideward.

**Movement.**

(1) Turn trunk to left, lowering both hands to ground beside

left foot, and exhale.

(2) Recover to original position, and inhale.

(3) Repeat count (1) to opposite side.

(4) Repeat count (2).

Three to four repetitions on each side.



### EXERCISE 9: STAIR CLIMBER

**Cadence.** Moderate to fast.

**Starting position.** Attention.

**Movement.**

For the first few days, patient does stationary walk only.

He later works into a slow stationary jog and by the end of the first week he will be jogging for about 30 seconds. By the end of the third week the patient should be able to do a slow jog of not more than 1 minute. The patient will do well to inhale on two steps and exhale on two steps.

**EXERCISE 10: AIR PUSH****Cadence.** Very slow.**Starting position.** Feet apart, knees slightly bent, arms flexed forward and palms up as though holding a heavy weight on the hands.**Movement.**

(1) Extending knees, go through the motion of pushing a heavy weight above the head. Inhale at the same time.

(2) Reverse position of palms and do an imaginary pull-up, finishing with fists clenched in front of chest.

(3) Repeat count (1).

(4) Repeat count (2).

From 6 to 10 repetitions.

Starting  
Position





Starting  
Position



**57. CONDITIONING EXERCISES FOR CLASS 3c CARDIAC PATIENTS.** All exercises for this group will be done on the bed or mat.

# **EXERCISE 1: EXHALE AND CONTRACT ABDOMEN**

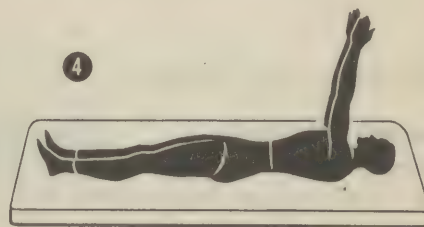
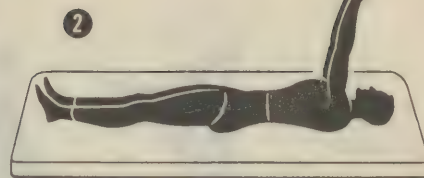
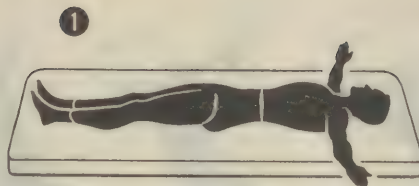
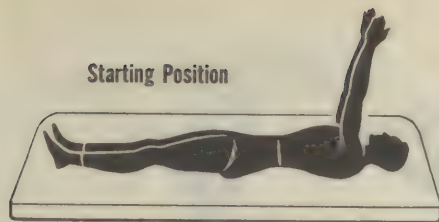
**Cadence.** Slow.

**Starting position.** On back, knees partially drawn up, arms by side.

**Movement.**

- (1) Exhale slowly and fully and draw the abdomen inward as far as possible.
- (2) Recover to starting position.
- (3) Inhale slowly raising chest as high as possible pressing downward slightly with the arms against the mat.
- (4) Recover to starting position.

Four to six repetitions.



## EXERCISE 2: ARMS FORWARD TO SIDEWARD

**Cadence.** Moderate to slow.

**Starting position.** On back, arms forward.

**Movement.**

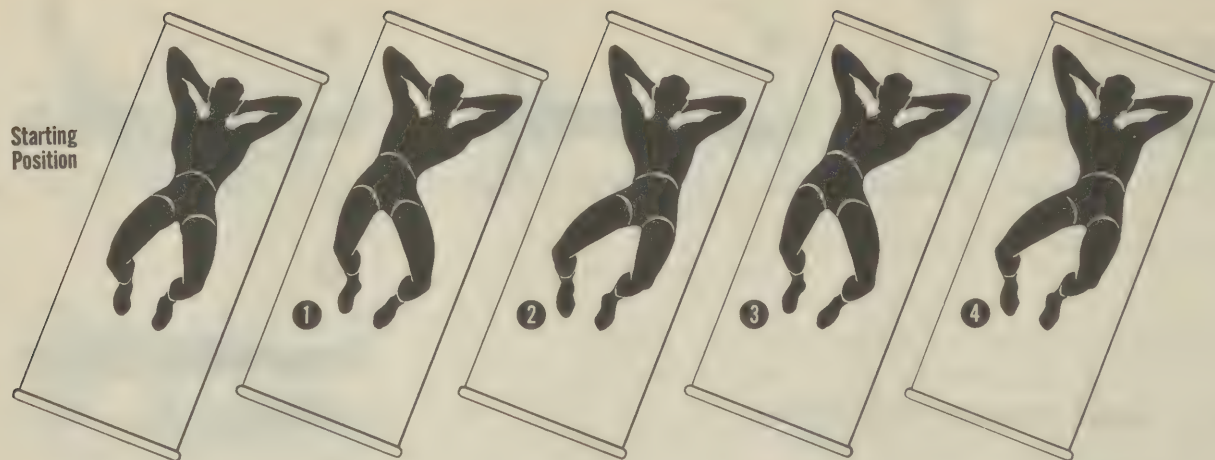
(1) Move arms sideward to side shoulder level position, at the same time inhale deeply.

(2) Recover to original position and exhale deeply.

(3) Repeat count (1).

(4) Repeat count (2).

Four to six repetitions.



### EXERCISE 3: HIP SWINGER

**Cadence.** Moderate.

**Starting position.** On back, fingers laced behind head, feet about 1 foot apart and drawn up near hips.

**Movement.**

(1) Lift hips clear of bed and swing them as far as possible

to the left.

(2) Lift hips again and swing them as far as possible to the right.

(3) Repeat count (1).

(4) Repeat count (2).

Four to six repetitions.

Starting Position

**EXERCISE 4: CAT STRETCH****Cadence.** Moderate.**Starting position.** On back, palms down on mat.**Movement.**

(1) Stretch the legs, tightening muscles on both sides of the leg (quadriceps and hamstrings), and stretch toes downward hard. Learn to make muscles hard like trying to "make a muscle" on upper arm. Inhale with this count.

(2) Relax the leg muscles generally but raise the toes upward hard, and exhale.

(3) Repeat count (1).

(4) Repeat count (2).

Four to six repetitions.

1



2



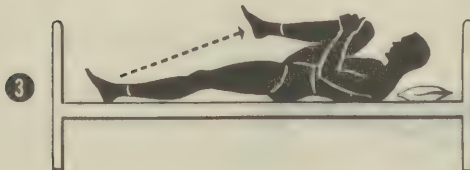
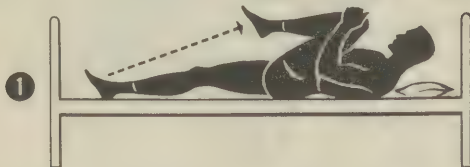
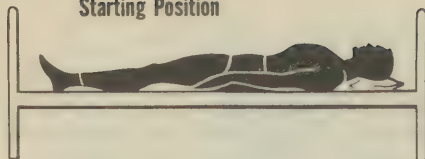
3



4



Starting Position

**EXERCISE 5: KNEE PULLER**

**Cadence.** Moderate to slow.

**Starting position.** On back, at attention.

**Movement.**

- (1) Raise left knee up towards the chest, grasping the leg below the knee with both hands and pulling knee hard up to chest. At the same time exhale deeply.
- (2) Recover to starting position and inhale.
- (3) Repeat count (1) with opposite leg.
- (4) Recover to starting position and inhale.

From 6 to 10 repetitions.





## EXERCISE 6: FLAP WINGS

**Cadence.** Moderate to fast.

**Starting position.** On back, at attention.

**Movement.**

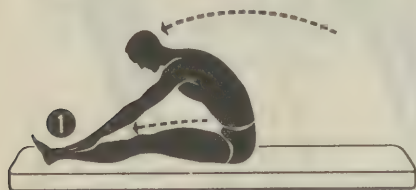
(1) With arms down extend wrists as far and as hard as possible.

(2) Flex wrists as far as possible.

(3) Repeat count (1).

(4) Repeat count (2).

Same, arms forward, and arms sideward, four to six times in each position.

**Starting Position****EXERCISE 7: SIT-UP****Cadence.** Slow.**Starting position.** On back, hands on thighs, feet under covers, if in bed.**Movement.**

- (1) Sit up, moving forward until fingers can touch lower leg between knees and feet, and exhale.
- (2) Recover to starting position, and inhale.
- (3) Repeat count (1).
- (4) Repeat count (2).

Six to eight four-count repetitions.

Starting  
Position

1



2



3



4



## EXERCISE 8: BREAKING CHAINS

**Cadence.** Slow.

**Starting position.** On back, elbows raised sideward, slightly off the mat, fists clenched in front of shoulders.

**Movement.**

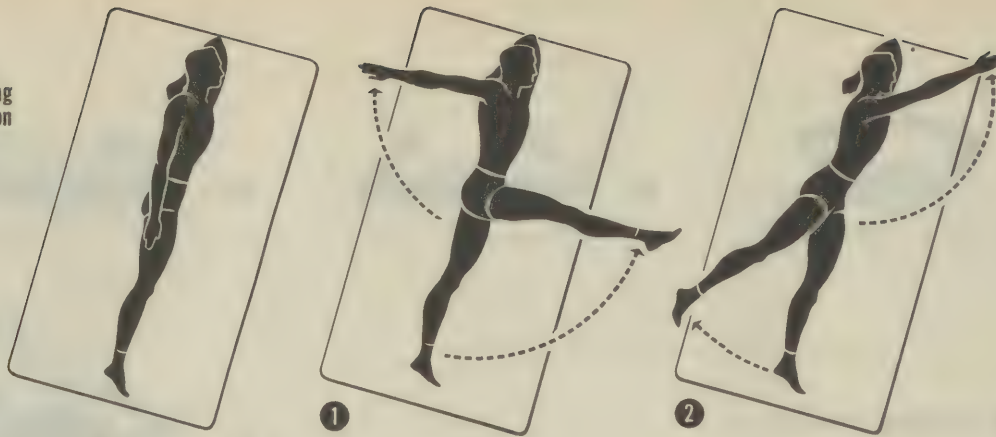
(1) Pull elbows back hard as if trying to break a chain held in the two hands. Press elbows hard against the bed, then relax.

(2) Pull again, then relax.

(3) Repeat count (2).

(4) Recover to starting position.

Four to six repetitions.

Starting  
Position

## EXERCISE 9: SWING AND KICK

**Cadence.** Moderate to slow.

**Starting position.** Lying on left side with left side of head resting upon left forearm.

**Movement.**

(1) Swing right leg straight forward along the mat and at the same time swing right arm directly to the rear. Exhale with

this movement.

(2) Swing right leg downward and backward behind left leg, and swing arm forward and up above head in line with body. Inhale with this movement.

(3) Repeat count (1).

(4) Repeat count (2).

Do three to four repetitions lying on left side, then turn over and repeat on opposite side.

Starting  
Position

## EXERCISE 10: RIB STRETCHER

**Cadence.** Slow.

**Starting position.** On back, knees fully bent, hands about 1 foot from side of the body.

**Movement.** (Do each movement three to six times before proceeding to the next. This is not a four-count exercise.)

(1) Lift chest and stretch to left as far as possible, then return to position.

(2) Repeat movement (1) to right.

(3) Arch back and raise chest as high as possible.

(4) Combine the first three movements. Do first repetition *left*, upward, right; do second repetition, *right*, upward, left; continue reversing the direction for each repetition.

Progression in the drill for Class 3c cardiac patients should be about one repetition each day up to the time when the individual can take approximately 20 minutes of exercise. As the patient progresses in strength there should be fewer rests between each exercise movement and between each different exercise.

1



2



3





## Section V. AQUATIC CONDITIONING EXERCISES

**58. CONDUCT OF AQUATIC EXERCISES.** a. If conditioning exercises are conducted during swimming activities, the men are arranged at the shallow end of the pool. The shorter patients should be in the front line and the taller in the rear line. The instructor stands on the shallow end. The men move backward in the water to about shoulder depth. They should not do aquatic exercises until they have learned the technique of water breathing. Some exercises require that the men hold to the edge of the pool for balance.

b. When water resistance exercise is used for remedial exercise, water buoyancy is used to counteract the normal effect of gravity. Such exercise must be individualized in small groups and given only on the prescription of the medical officer.

c. In all of the exercises given below, the movements should be done about 16 times each. Water resistance makes the work load greater, so that cadence and number of repetitions should be carefully regulated to tolerance.

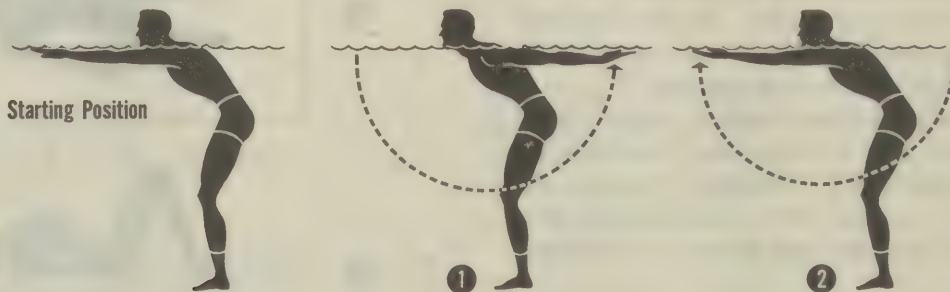
### EXERCISE 1:

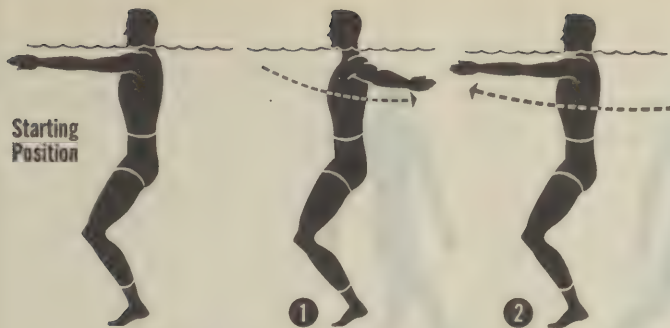
**Starting position.** Leaning forward in water with chin at surface. Arms extended forward at surface, palms down.

#### **Movement.**

- (1) Fling arms downward and backward to surface.
- (2) Reverse palms; pull arms forward to starting position.
- (3) Reverse palms and repeat count (1).
- (4) Repeat count (2).

Swing arms vigorously throughout exercise.





## EXERCISE 2:

**Starting position.** Standing in water with knees slightly bent so that water is about level with chin. Arms are extended forward, palms outward.

### **Movement.**

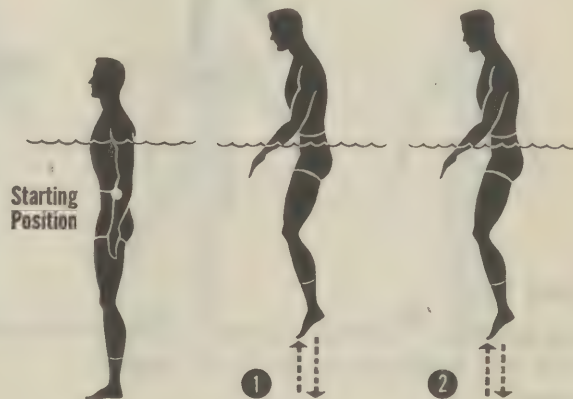
- (1) Fling arms sideward and backward.
- (2) Reverse palms; recover to starting position as rapidly as possible.
- (3) Repeat count (1).
- (4) Repeat count (2).

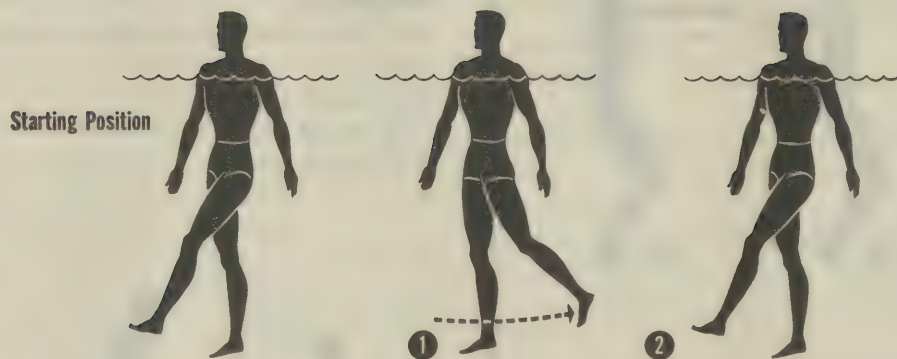
## EXERCISE 3:

**Starting position.** Standing erect in water.

### **Movement.**

- (1) Jump as high as possible and recover to starting position.
- (2) Repeat count (1).
- (3) Repeat count (1).
- (4) Repeat count (1).





#### EXERCISE 4:

**Starting position.** Standing on right leg with left leg forward and arms slightly out to the side for balance.

**Movement.**

(1) Kick left leg backward vigorously.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Recover to starting position.

Execute half the total repetitions on each foot.

**EXERCISE 5:**

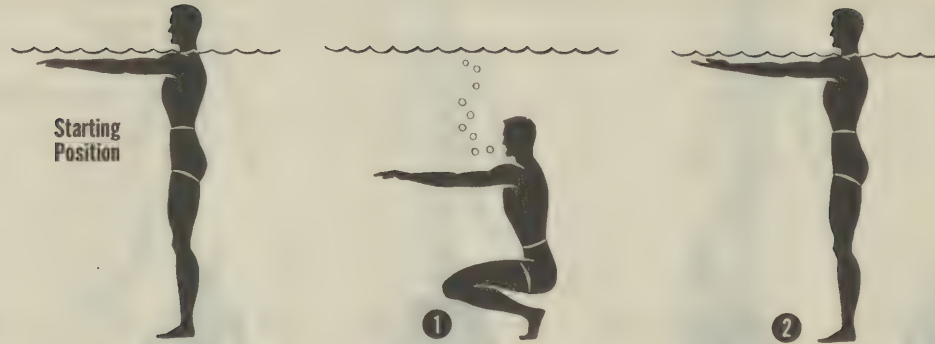
**Starting position.** Standing erect in water with arms slightly out to side for balance.

**Movement.**

- (1) Kick left leg sideward and upward as far as possible.
- (2) Recover to starting position.
- (3) Kick right leg sideward and upward as far as possible.
- (4) Recover to starting position.

Starting Position





### EXERCISE 6:

**Starting position.** Standing erect in water at shoulder depth, with arms extended forward and palms down.

**Movement.**

(1) Do full knee bend, breathing out through mouth and

nose while going down.

(2) Return to starting position, breathe through mouth after coming to surface. Reverse palms.

(3) Repeat count (1).

(4) Repeat count (2).

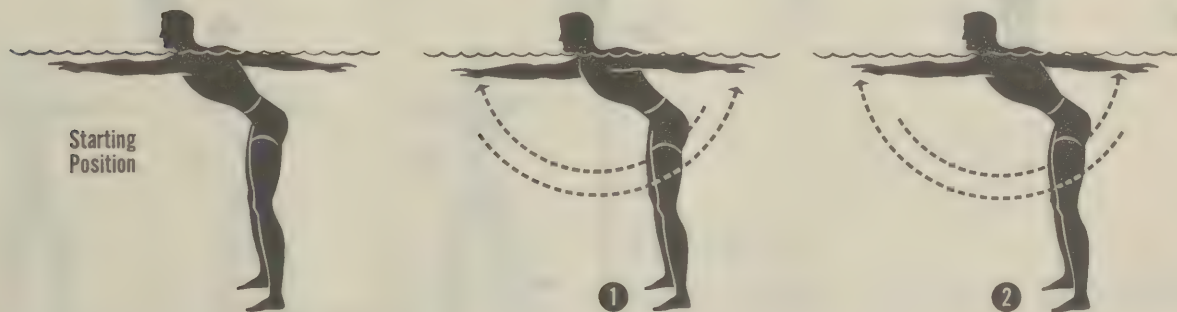


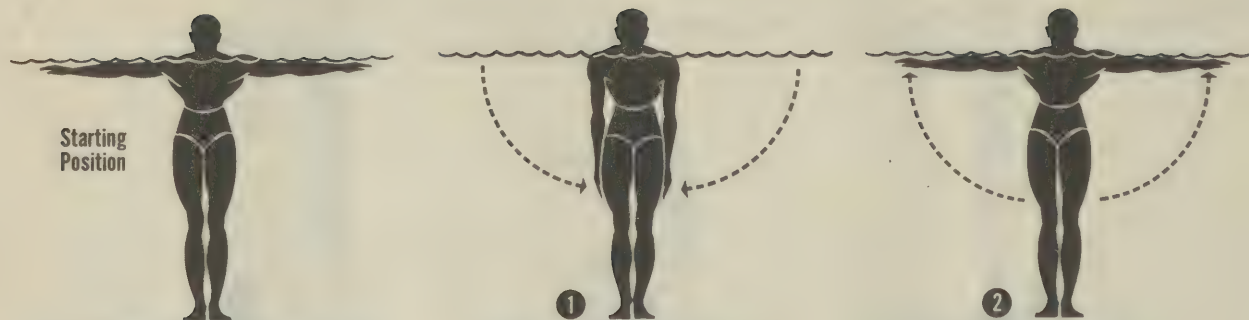
**EXERCISE 7:**

**Starting position.** Standing and leaning forward at hips so that water is at shoulder level. Feet in side-straddle position. Left arm extended forward, palm down; right arm extended backward, palm down.

**Movement.**

- (1) Sweep left arm downward and backward and right arm downward and forward until position of arms is reversed.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 8:**

**Starting position.** Standing and leaning forward at the hips. Arms sideward, palms down.

**Movement.**

- (1) Swing arms vigorously down to sides.
- (2) Swing arms vigorously back to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 9:**

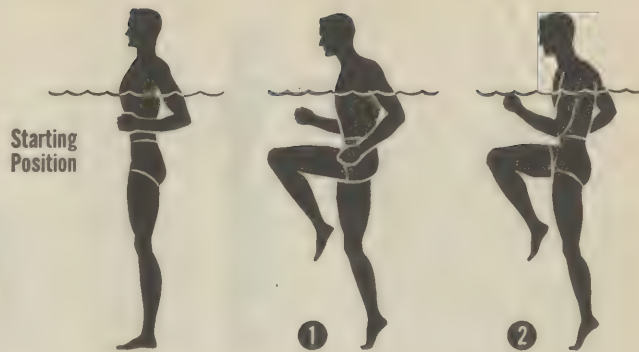
**Starting position.** Feet in side-straddle position with trunk turned to left. Arms are sideward. Chin is at water level.

**Movement.**

- (1) Turn trunk to right as far as possible.
- (2) Turn trunk to left.
- (3) Repeat count (1).
- (4) Repeat count (2).

Resist water as much as possible with arms.

This exercise also done with arms at thrust.

**EXERCISE 10:**

**Starting position.** Standing erect with water at height of chest. Arms are at thrust.

**Movement.** Execute a vigorous stationary run, raising knees high and swinging arms forward and backward.



### EXERCISE 11:

**Starting position.** Standing in side-straddle position in water at chest height. Arms are forward on surface of water.

**Movement.**

(1) Bend forward, keeping knees straight. Exhale.

(2) Recover to starting position. Inhale when face comes to surface.

(3) Repeat count (1).

(4) Repeat count (2).

## CHAPTER 5

### SPORTS AND GAMES

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**59. GENERAL.** a. The games selected for the physical reconditioning program are classified in this manual according to the classes of the patients or trainees for which they are adapted. A large number of sports and games are recommended for Class 1 and 2 trainees to provide for varying facilities, climatic conditions, and different situations encountered in hospitals. None of these activities are recommended for Class 4 patients, and only a few for Class 3 patients. However, the Red Cross hospital program provides recreational games for Class 4 and 3 patients. Leadership and equipment for these activities are provided by the Red Cross.

b. The personnel responsible for the reconditioning program must study the games carefully, keeping in mind the purposes of the program. Since the exercise should become progressively strenuous, there must be progression in the games selected. The temptation to continue such mild but interesting

games as softball or volleyball as conditioning activities must be resisted. These games may, of course, be engaged in by trainees in their free time for recreational purposes. Only those games approved by the ward officer should be used for Class 3 patients.

c. Many of the games suggested are described in TM 21-220, Sports and Games, and TM 21-221, Informal Games for Soldiers. The games not included in those manuals are described in paragraph 65 in alphabetical order.

#### **60. WARD GAMES FOR CLASS 3b PATIENTS.**

Badminton (Played without a net. The bird is volleyed and kept in the air.)  
Box hockey  
Darts

Quoit tennis  
Rope quoits  
Shuffle board  
Table tennis



## 61. OUTDOOR OR GYMNASIUM GAMES FOR CLASSES 3a AND 3b.

Archery	
Badminton doubles	One basket basketball (no dribbling or contact guarding)
Bowling (May be played with soft ball, croquet ball, or soccer ball if no alleys are available. The floor of a vacant ward may be used if the ground outdoors is not suitable.)	Pepper ball
Crows and cranes	Pitching golf balls into baskets or buckets
Goal-hi (no dribbling or contact guarding)	Pitching golf ball for targets on the ground
Horseshoes	Punting or drop kicking for distance or accuracy
Indian ball	Quoit tennis
Miniature golf	Short-hole golf—pitch and put
Nine man volley ball (no spiking)	Shower ball
	Table tennis
	Twenty-one

## 62. GAMES FOR CLASS 2.

Dodge ball	One basket basketball
Goal-hi	Pull-away
Going our way	Shower ball

Hand hockey  
Keep-away  
Line soccer  
Mass soccer

Sideline soccer  
Soft ball (slow ball pitching)  
Soft ball work-up

## 63. GAMES FOR CLASS 1.

Basketball	Kick ball
Box basketball	Mass soccer
Broncho busting	Pull-away
Cage ball	Side line soccer
Goal-hi	Speed ball
Going our way	Touch football
Hand hockey	Tug of war
Keep-away	

## 64. MISCELLANEOUS GAMES FOR FREE PERIODS.

Archery	Quoit tennis
Badminton	Six-man soccer
Box hockey	Soft ball
Foul shooting (basketball)	Table tennis
Four-man volley ball	Twenty-one
Handball—one or four wall	Volley ball
Horseshoes	Work-up softball

## 65. RULES OF GAMES.

**ARCHERY** (See TM 21-220.) In addition to the methods outlined in TM 21-220, another method of sighting\* is preferred for soldiers. A strip of adhesive tape 1 inch wide is pasted on the back of the bow (the side away from the shooter). It should extend about 8 inches upward from the position of the arrow. A pin, preferably somewhat longer than an ordinary pin, should be stuck part way through underneath this adhesive on the side of the hand holding the bow (on the left side of the bow for right-handed shooters). The tip of this pin is used like a gun sight. The archer sights with his right eye and holds it on the center of the gold (bull's eye). Each shooter should determine by a little experimentation the height and distance from the bow the head of the pin needs to be for any given range on any given day.\* He can then shoot without a "point of aim" exactly as he would shoot a gun. This method is used by some of the best archery experts.

The usual archery target is made of straw with a face, upon which the target is painted, fixed to the front. The target is placed upon a tripod. Arrows that miss the target entirely travel quite a distance. Often they bury themselves in the

\* The casting strength of the bow will differ from day to day with the temperature, and it will, of course, differ from man to man with the length of the pull. Allowance must be made for windage.

grass and are hard to find. For use in the reconditioning programs, a more satisfactory target may be made by fastening the target face to a bale of hay or straw. Several bales piled up to form a front of about 8 feet square will stop most of the arrows. This type of background makes a very satisfactory target.

**BADMINTON.** (See TM 21-220.) Because of the difficulty of getting birds and rackets, this game may be played with paddles slightly larger than a ping-pong paddle and a fleece ball. A form of badminton may also be played on the ward or outdoors by Class 3 patients who volley the bird back and forth, attempting to make as many consecutive hits as possible.

**BASKETBALL.** See TM 21-220.

**BOWLING.** See TM 21-220 and TM 21-221.

**BOX BASKETBALL.** See TM 21-221.

**BOX HOCKEY.** See TM 21-221.

**BRONCHO BUSTING.** The players called bronchos and riders are divided into teams of equal numbers. Opponents of approximately equal weight are paired. The broncho bends down, placing his hands on his knees. The rider sits on the back of the broncho with his thighs clamped behind the

broncho's hips (not around the body) and with his hands on the broncho's shoulders. Each broncho then tries to buck the rider off and wins if he succeeds within the time limit. The broncho may not remove his hands from his knees; he also loses if he falls to the ground. The teams alternate as bronchos and riders. Three 1-minute innings are held. The team that retains the greatest number of riders on the bronchos is the winner.

**BRONCHO TAG.** See TM 21-221.

**BUCKING BRONCHO.** See TM 21-221.

**CROWS AND CRANES.** See TM 21-221.

**DODGE BALL.** See TM 21-221.

**FOUL SHOOTING.** The competitors shoot an agreed number of basketball foul shots. The one making the largest number of baskets wins. (Only for Class 3b.)

**FOUR-MAN VOLLEY BALL.** See TM 21-221.

**GOAL-HI.** See TM 21-221.

**GOING OUR WAY.** Arrange three parallel lines 5 yards apart and at least 17 yards long. The men are arranged side by side on the middle line. They are counted off by two's, those with even numbers do an about face. The men are now

in formation on the middle line, alternate men facing in the opposite direction. The men link elbows. The object is for each team to go in the direction it is facing and take the opposing team across the line 5 yards away. Teams may number 25 to 50.

**HAND HOCKEY.** The playing area is about the size of a football field; if the number of players is not too great, it can be smaller. The group is separated into two teams with from 20 to 50 on a side. One soccer ball should be used for approximately each 10 men on a side. Half the players, who are guards, are stationed behind the goal line and are permitted to take only one step into the playing field. The other half of each team gathers in the center of the field. The balls are on the center line of the field. When the whistle blows, all the men rush for the balls. A ball must be rolled on the ground with the hands only and cannot be picked up, dribbled, or kicked. When a ball goes out of bounds, it is thrown in at a right angle from where it went out. After 10 minutes of play the players and guards exchange places. If more than one ball is used, each player should follow his own ball. There should be a referee for each ball. A goal is scored whenever a ball is rolled over the goal line, and the goal counts one point.

**HORSESHOES.** See TM 21-220.

**KEEP-AWAY.** See TM 21-221.

**KICK BALL.** See TM 21-221.

**LINE SOCCER.** See TM 21-221.

**MASS SOCCER.** See TM 21-221.

**MINIATURE GOLF.** This game may either be practiced on a series of level putting strips—in which case only a putter is used—or on a miniature pitch-and-putt golf course which may be constructed. In this latter type, of course the holes are surrounded by small greens, usually not over 15 feet in diameter, and the pin is located from 20 to 50 yards from the tee. The player uses a pitching iron and a putter. Otherwise, rules are as in golf.

**NINE-MAN VOLLEY BALL.** This is played in the same way as ordinary volley ball (TM 21-220) except that there are nine men on a side. It may also be played with 12 men on a side. This is a rather gentle game and should be scheduled only for Class 3b patients.

**ONE-BASKET BASKETBALL.** See TM 21-221.

**ONE-WALL HANDBALL.** See TM 21-220.

**PEPPER BALL.** This game is frequently played by baseball players warming up before the game. Several players line up opposite one batter, who is usually about 30 to 40 feet away. These players throw the ball to the batter, attempting to throw

a good strike. As the batter hits the ball gently back to the throwers, the men fielding the ball may throw to the batter or to one of the other players. A man frequently fakes a throw to one and tosses to another. This is a good game for developing alertness and for general warming up. It is recommended for Class 3 patients.

**PITCH GOLF.** A golf ball is struck with some pitching iron, usually a No. 5, a No. 7, or a No. 8. It may be pitched in several ways. It may be pitched against a wall so that it will rebound into a basket, or it may be pitched directly into a basket. Another method is to put a ring, usually of rope, on the ground and pitch the ball so that it stops in the ring. The ring should be about 3 feet in diameter. The pitching may start from any desired distance; however, the distance is not usually over 20 or 30 feet. For distances of 50 to 70 feet, the ring should be 6 to 10 feet in diameter.

**PULL-AWAY.** See TM 21-221.

**PUNTING A FOOTBALL.** When punting for accuracy, draw a target about 6 feet in diameter on the ground. The kicker tries to punt direct to a man standing within the target. That man must touch or catch the ball with at least 1 foot within the target area; or the two men may punt back and forth. Another method is to play a game on a football field in which one team punts from the 25-yard line and the other



team punts from behind the spot where the ball is caught. If the ball is caught on the fly, it is punted from that spot. If the ball is lost and picked up on the bounce or after it stops, it is punted from that spot. The team first kicking the ball over the opponent's end line scores.

**QUOIT TENNIS** (deck tennis). A court 18 by 34 feet is divided in the middle by a net  $4\frac{2}{3}$  feet high. Cross-lines, known as foul lines, are drawn 3 feet from the net on either side. Players may not step beyond these lines when throwing the quoit. For singles play, 2 additional side lines 3 feet inside the original side lines are drawn, making the court 12 feet wide. There are 2 lengthwise center lines on either side of the net running the length of the court, which divide the court into service courts for doubles. The game is played with a quoit or rope ring 6 inches in diameter (which is made by splicing the ends of some  $\frac{1}{2}$ -inch rope). The server stands behind the rear line and tosses the ring with an underhand motion into the opposing court. The receiver must catch the ring and return it without delay. Only one hand may be used. The toss must always be underhanded and from the spot from where the ring was caught. The game consists of 15 points and is scored the same as volley ball; that is, the server continues to serve until he loses, when the opponent begins to serve. In doubles, only one partner serves in the first serving.

After that the two partners serve one after the other, each serving until he is put out.

**ROPE QUOITS.** Rope rings from 6 to 8 inches in diameter are made of  $\frac{1}{2}$ -inch rope by splicing the ends or by taping them together. These quoits may be thrown over a peg fastened to a quilted board. They may also be tossed over the legs of a chair placed with the back of the chair and the front edge of the seat on the floor. They may be tossed into a circle 2 feet in diameter drawn on the floor or ground. The score is usually one point for each quoit that sticks on the peg or other objective. The game may be fitted to any number.

**ROPE SPINNING.** The rope used should be a 20-foot length of  $\frac{3}{8}$ -inch cotton sash cord. This is commonly known as No. 12 sash cord. One end is doubled back and fastened with wire or adhesive to form a loop or honda  $\frac{3}{4}$ -inch long. The rope is opened up into a large loop about 13 or 14 feet in circumference. The part of the rope outside of this large loop is not doubled back after passing through the honda, but continues on. The rope spinner grasps the rope about 3 feet from the honda. He then swings his right arm outward to the right and swings the rope in a counterclockwise circle in front of him. After he throws it, he lets go of the loop with his left hand, but not with his right. As the rope spins, the part in the hands will twist; hence the spinner must keep



untwisting the rope all the time he is spinning it. The spinning should be a gentle maneuver. After learning to spin a loop above the floor in front, the player may practice other more complicated maneuvers. For example, instead of spinning it on the ground, he may toss the rope up by the right hand around to the front and to the left over his head. He holds his spinning hand above his head and spins the rope around his waist. When spinning the rope close to the ground, the spinner can learn to jump into the loop. In this case he must transfer his rope from the left hand to right, and back and forth. He may then jump out, or he may jump into the loop and out again immediately. It is also possible for him to spin the loop so that it will be vertical at his side or in front of him.

**SHORT-HOLE GOLF.** The same as golf, except that the holes are quite close together and are frequently laid out between two wards.

**SHOWER BALL.** See TM 21-221.

**SIDE LINE SOCCER.** See TM 21-221.

**SIX-MAN SOCCER.** This game is played like soccer football (TM 21-220), except that there are only six men on a side—three forwards, two half-backs and one full-back—and there is no goal keeper. It is usually played crosswise of the

football field with jumping standards, or simply with two piles of sweat shirts for goals.

**SOFTBALL.** See TM 21-220. In general, with patients the 16-inch ball is preferable to the small ball, and the so-called slow ball pitching is preferable to unlimited fast ball pitching. In slow ball pitching the ball must be arched high enough so that the top of its flight is above the line tangent to the tops of the heads of the pitcher and batter. When a small number of players are available, it may be played as "scrub" baseball.

**SPEED BALL.** See TM 21-220.

**SWIMMING.** Where swimming pools are available for the reconditioning program, swimming should be actively promoted. It is excellent exercise and one of the most useful activities for the trainee. His mastery of swimming may be the means of saving his own and other lives. It is well to test all trainees as to their swimming ability on their first appearance in the pool. The tests to be used are those in FM 21-20.

The methods used and strokes to be taught will be found in FM 21-20. As the trainee is in the advanced reconditioning section of the hospital for only a few weeks, it will be well for him to concentrate on the basic strokes, particularly

the elementary dog paddle, the elementary back stroke, the breast stroke, and the underarm side stroke. The side stroke should be learned with both the ordinary scissors kick (upper leg kicking forward) and with the inverted scissors kick (lower leg kicking forward), as the latter is excellent for use in life saving.

There is a great tendency simply to play around in the water. To prevent this, the instructor should organize the swimming instruction so that the patients will systematically practice the various strokes and other techniques which it is desired they should learn. This is best accomplished with beginning swimmers by lining up half of the class on each side of the pool, or later, when the better swimmers are practicing, by lining up half on each end of the pool. Each half then successively engages in practice, swimming long enough to tax both strength and endurance.

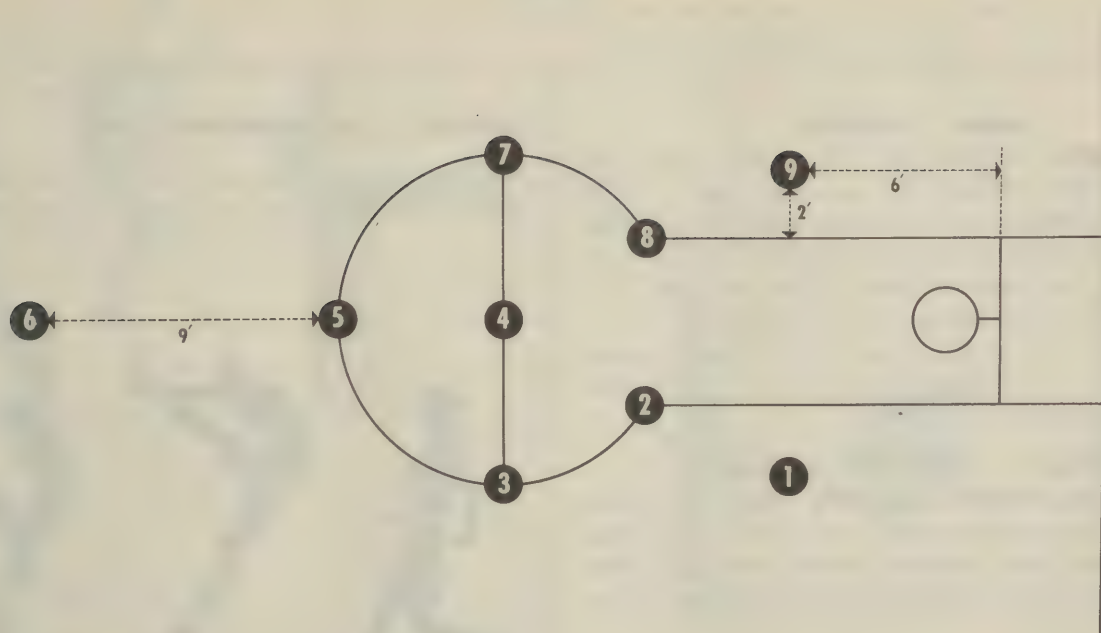
**TABLE TENNIS OR PING PONG.** See TM 21-220.

**TUG OF WAR.** A rope, preferably 150 feet in length and  $1\frac{1}{2}$  inches in diameter, is stretched so that the midpoint rests

halfway between 2 lines which have been marked on the ground 5 yards apart and at right angles to the rope. A 2-inch band of tape is placed at the midpoint of the rope. Each side lines up with its strongest man nearest the tape. All the men grasp the rope. Each team faces the tape. At the signal each team pulls. The winner is the team which pulls the tape mark on the rope over its own (nearer) line. A contest equals three out of five pulls.

**TWENTY-ONE.** This is a basketball throwing game in which basketball goals or goal-hi goals are used. A number of spots are located on the floor, and the men in turn shoot from those spots, beginning from the first. Each man shoots as long as he makes baskets. As soon as he fails the next man begins. This continues until someone makes 21 baskets. Each man, however, should shoot an equal number of turns. The spots on the floor should vary from 6 to 30 feet from the basket. The usual arrangement of spots is illustrated at the right.

**VOLLEY BALL.** See TM 21-220.



TWENTY-ONE

## CHAPTER 6

### STUNTS

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#### Section I. GENERAL

**66. DEFINITION.** a. Stunts are feats of skill, strength, or endurance properly presented in competitive spirit. Many stunts are exceedingly strenuous and are good exercise. They may be injected into the rotating group exercises on a par with tumbling and apparatus stunts. There are types which develop *balance, agility, strength, and endurance.*

b. Stunts are used primarily with Class 1 and 2 trainees, but may also be used with the stronger Class 3 patients where the medical officer prescribes.

#### Section II. STUNTS OF BALANCE

**67. INDIVIDUAL TUMBLING STUNTS.** Many of the stunts in individual tumbling may be used as stunts of balance. These include the squat stand, headstand, forearm headstand, elbow stand, backward roll to headstand, and the handstand. (See FM 21-20.)

#### Section III. STUNTS OF AGILITY

**68. FOR DEVELOPING FLEXIBILITY.**

#### EXERCISE 1: RUNNING HIGH KICK

Run a few steps, jump from one foot, then kick as high as possible with the other foot. Land on take-off foot.





### EXERCISE 2: HITCH KICK

Jump from one foot, kick with the same foot, then land upon the same foot. After alighting, hop on that foot three times before placing the other foot upon the mat.

### EXERCISE 3: JUMP STICK

Hold a wand or broomstick, at least 2 feet long, in both hands, keeping the arms parallel. Jump high in the air and swing stick backward underneath the feet. On the second jump, swing stick forward to the original position.







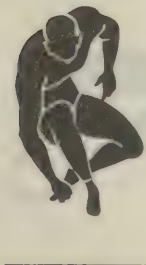
#### EXERCISE 4: UNDER STICK

Grasp a baseball bat or wand with the right hand 6 inches from one end and the left hand about 24 inches above the

right hand. Place right end of the bat on the ground in vertical position. Putting weight on bat, twist body downward to the right underneath the right arm and return to the original position. This stunt may be done continuously for as many times as possible.

**EXERCISE 5: JUMP FOOT**

Grasp the toes of one foot with the opposite hand and jump over this foot with the other foot. It is necessary to jump high with the jumping leg, pull the foot up high, and sweep the other hand and foot backwards past the jumping foot. Then jump back to original position.

**EXERCISE 6: RUSSIAN DANCE**

Squat down on both heels with arms forward. Then extend one leg forward until the knee is straight and the heel rests on the floor. Alternate feet rapidly and rhythmically. *Not to be used with knee cases.*



### EXERCISE 7: MULE KICK

Swing up to a temporary handstand. Bend knees and swing feet over back; then pushing hard with the hands, snap feet down to the ground and come up to a semi-stand position. Again jump to the handstand position and continue to snap back and forward.

### EXERCISE 8: PIKE JUMP

Jump upward and with knees straight, swing legs forward; reaching forward with hands, touch toes. Repeat as many times as possible.





#### Section IV. STUNTS OF STRENGTH

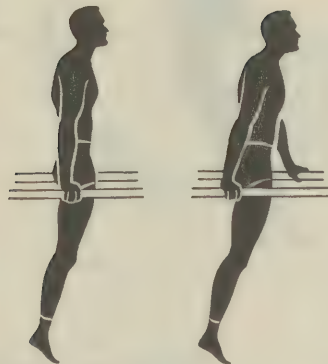
##### 69. FOR DEVELOPING ARMS AND SHOULDER GIRDLE.

###### a. Horizontal bars.

##### EXERCISE 1: ALTERNATE ARM BREAST UP

Hang on a horizontal bar and pull up as high as possible; raise one elbow above the bar, then the other; then push up to a rest with straight arms.

## b. Parallel bars.

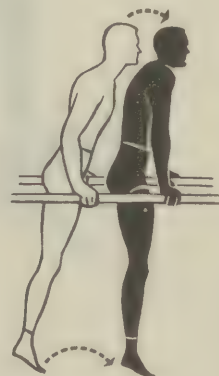


### EXERCISE 2: HAND WALK

From a position of resting on the bars on the hands, walk from one end of the parallel bars to the other end with the hands. Keep arms straight. Performer may also make a turn at the far end and walk back.

### EXERCISE 3: HAND JUMPS

With hands at ends of bars, and facing the far end, progress by a series of jumps made on the hands. These may be short jumps made without swing or longer jumps made at the end of a swing.





**EXERCISE 4: PULL-UPS**

Grasp the rope at arm's length above head and pull up until chin is above top hand. Repeat as many times as possible.



**c. Vertical ropes.** The best rope for rope climbing is 3-strand manila,  $1\frac{1}{2}$  inches in diameter. The top should be at least 20 feet from the floor. All soldiers should practice climbing enough to be thoroughly at home on the rope; to know how to climb with hands and feet, and with hands alone; and to know how to descend the rope without permitting it to slide through the hands. Since the soldier may need to ascend or descend a rope in wet clothing and with wet hands he should be given some practice in climbing the ropes in heavy clothing after mastering rope climbing. The exercises listed below are roughly in order of the difficulty of performance. Unless otherwise indicated, exercise begins with performer standing.



### EXERCISE 5: GRASPS WITH HANDS AND FEET

Jump upward, grasping rope overhead at arm's length with both hands. Pull up until chin is about even with top hand, then grasp rope with legs. This is done by having rope pass between thighs and across in front of left instep. The outside of the right ankle is placed in front of rope, and rope is pressed between left instep and right ankle. To hold position, tightly clamp thighs, as well as feet, on rope.

### EXERCISE 6: CLIMB WITH HANDS AND FEET

Grasp rope with hands as far as possible overhead and between feet. Bend knees and draw feet up toward hips. Then straighten legs downward and pull up at same time with hands. Holding rope between feet, reach upward with hands and repeat performance. Climb about 10 feet, then come down the rope in like manner.





### EXERCISE 7: REST ON FOOT

Climb about 10 feet, using arms and legs, then rest on rope by drawing rope under right foot with left toe and resting right foot in the loop.

### EXERCISE 8: REST FOOT AND ARMPIT

Same as exercise 7 above, except that when holding rope with feet, lean forward and to the left, keeping right arm in front of rope, then clamp rope to the side. Rope is held by feet and in armpit, leaving hands free.



### EXERCISE 9: HAND OVER HAND

Climb 10 feet, hand over hand, without help of feet.

## 70. FOR DEVELOPING LEGS.



### EXERCISE 1: ONE KNEE DIP

Grasp the toes of the right foot with the left hand, holding the hand and foot behind the standing leg. Bend the knee of the standing leg until the right knee touches the floor. Then rise to the erect position again. This may be done only once, or there may be competition to see how many times each individual can do it.

### EXERCISE 2: ONE LEG SQUAT

Raise one leg forward and raise both arms forward for balance. Squat on the other foot (which is flat on the floor) until the hip is resting just above the heel. The opposite leg is completely raised from the floor. Then rise to a stand.



## 71. FOR DEVELOPING BACK.



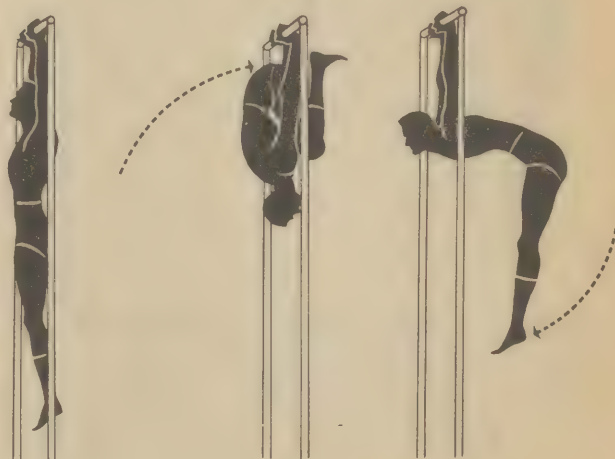
### EXERCISE 1: BRIDGE ON HEAD AND HEELS

Lie full length on back, folding arms across chest. Then rise from the mat by pressing down with head and heels. The knees must be straight. The fists may be placed alongside the head with elbows up when this stunt is learned.

## 72. FOR DEVELOPING ARMS AND ANTERIOR TRUNK. a. Horizontal bars.

### EXERCISE 1: "SKIN THE CAT."

Hang with ordinary grasp from the horizontal bar. Raise legs with the knees bent and thrust the legs between the arms. Then lower the legs and trunk back through the arms until body hangs downward as far as possible. Return in reverse order.







## EXERCISE 2: SWING ON HORIZONTAL BAR.

Pull up on the horizontal bar and raise legs close to the bar. Thrust legs out forward and upward with a push backward of the arms. Then swing backward and forward.



### EXERCISE 3: BACK CIRCLE TO FRONT REST

Hang from a horizontal bar, pull up and thrust legs backward above the bar, then turn over to a rest on the bar, supporting body with the hands.

**b. Mat.****EXERCISE 4: ELBOW EXTENSION PRESS-UP**

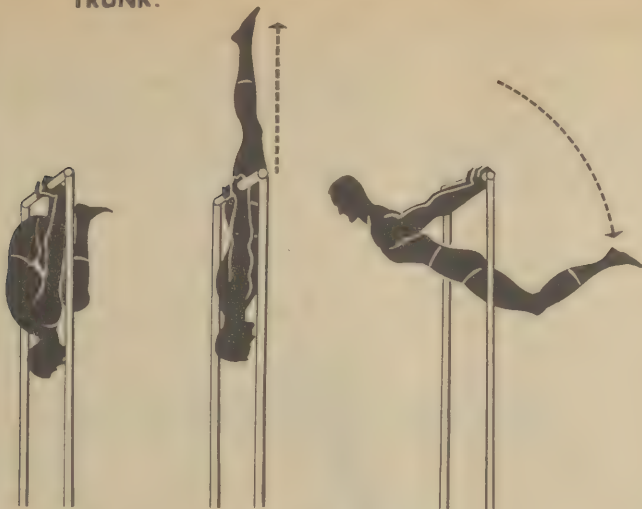
Lie face down on the mat with legs stretched straight out behind and arms straight out as far as possible in front. Resting on toes and elbows, press all other parts of the body up away from the mat.

**EXERCISE 5: HAND EXTENSION PRESS-UP**

Lie face down on the mat with legs stretched straight out behind and arms straight out as far as possible in front. Press up on toes and hands. Keep elbows straight. (This can be made into a competition by seeing how long each individual can hold the position with waist line 6 inches from the floor.)



### 73. FOR DEVELOPMENT OF ARMS AND POSTERIOR TRUNK.

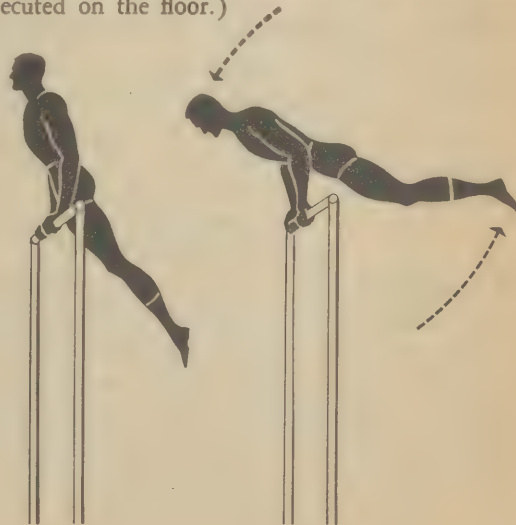


#### EXERCISE 1: BACK LEVER

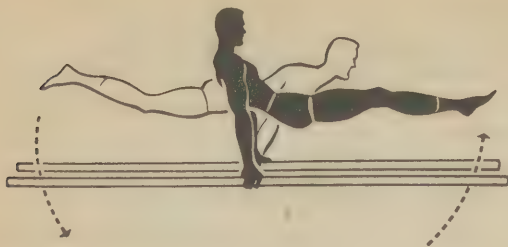
Hang from the horizontal bar, then raise legs and thrust them under the bar between arms. Straighten the body upward behind the bar so that it is in a straight line from shoulders to heels. Then lower the body until it is almost horizontal or parallel with the floor. Hold this position for 5 seconds before dropping to floor.

#### EXERCISE 2: ELBOW LEVER

Hang from the horizontal bar and do a back circle to front rest (see exercise 3, par. 72a). Change to a reverse (palms forward) grasp. Then bring hands closer together until they are from 9 to 12 inches apart. Propping elbows against sides just above the hips, lean forward until body is almost parallel to the floor and above the bar. Only the hands touch the bar. Hold this position for 5 seconds before dropping to floor. (A variation of this stunt can also be executed on the floor.)



## 74. FOR DEVELOPMENT OF ARMS AND TRUNK.



### EXERCISE 1: SWINGING ON PARALLEL BARS

Swing forward and backward from a position of a cross rest (resting on hands, one hand on each bar, arms straight). As legs swing backward, head and shoulders should move forward, and vice versa.

## Section V STUNTS OF ENDURANCE

**75. GENERAL.** The exercises used in the physical fitness tests may also be used as competition endurance tests. These are the pull-ups, push-ups, squat thrust, sit-ups, and squat jumps. (See FM 21-20.) These can be varied by competing in the number that can be accomplished in 10 seconds, 20 seconds, 30 seconds (pull-ups, push-ups); or in 30 seconds, 1 minute, or 2 minutes (squat thrust, sit-ups).

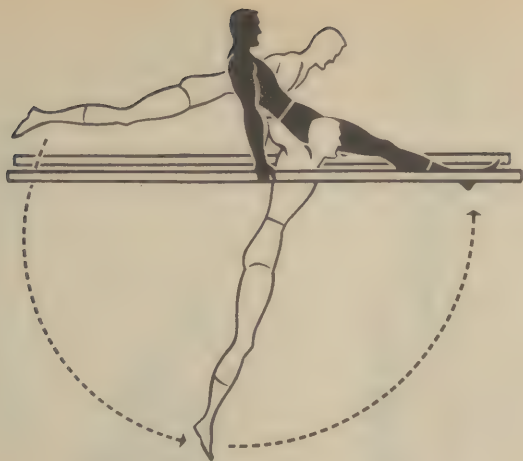
## 76. FOR DEVELOPMENT OF ARMS.

### EXERCISE 1: STILL DIPS

From a position of a cross rest on the parallel bars, lower the body by bending the elbows fully. Then push up again to the cross rest. Repeat as many times as possible.







## EXERCISE 2: SWINGING DIPS

Swing from a position of cross rest on the ends of the parallel bars. On the end of the back swing, while starting to swing forward, lower the body by bending the elbows, and push up again at the end of the front swing. Repeat on each swing.

## 77. FOR DEVELOPMENT OF LEGS.

### EXERCISE 1: FULL SQUATS WITH WEIGHT BEHIND SHOULDERS

Hold a bar bell weighing half own body weight to within the nearest 5 pounds. (For example, a 152-pound man would use a 75-pound bar bell.) Bell rests on the back of the shoulders and is held with the hands. Stand with feet apart about shoulder width, with toes turned slightly outward. Then squat completely down, keeping the feet flat on the floor. Repeat as many times as possible.

### EXERCISE 2: ROPE SKIPPING (See par. 107.)

Number of the following stunts which can be done successfully: front crosses, back crosses, front doubles, and back doubles.

## 78. FOR DEVELOPMENT OF MUSCLES OF ARMS, THIGH FLEXORS, AND ABDOMEN.



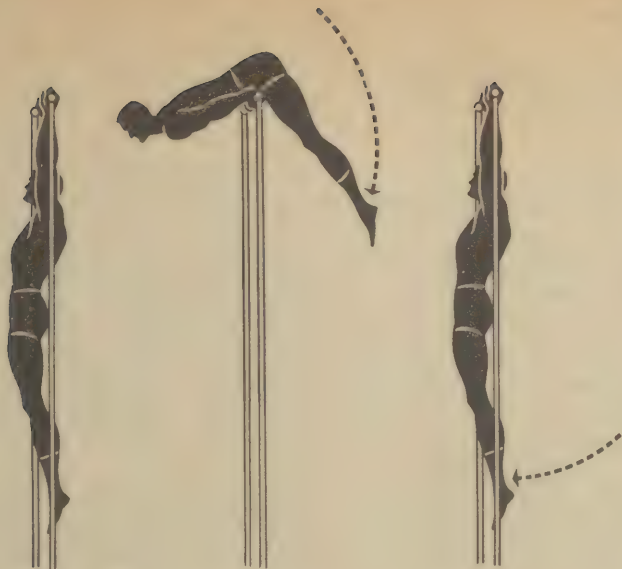
### EXERCISE 1: HALF LEVER, SPREAD LEGS

From a position of cross rest on the parallel bars, raise thighs with knees straight, to a position higher than the bars. Then separate the legs and bring them together again as many times as possible before fatigue forces lowering of the legs.

### EXERCISE 2: THIGH CURLS

Hang from horizontal bar with ordinary grasp keeping knees completely straight. Raise feet to bar so that the insteps touch bar then return to the hang as many times as possible. Do not start the upward motion with a swing, but from a dead hang. If unable to do this, begin by swinging legs up with knees doubled up.





### EXERCISE 3: BELLY GRINDS

Hang with ordinary grasp from horizontal bar. Then pull up, make a back circle over the bar, and return to a hang. Do this continuously for as many times as possible without pausing.

## 79. FOR DEVELOPMENT OF MUSCLES OF BACK

### EXERCISE 1: BACK LIFTS

This may be done in two ways: (a) without regard to time or (b) doing as many as possible in 2 minutes.

Performers are grouped in threes according to height. One man lies face downward on the floor and clasps hands behind head. The second man holds the first man's feet down. The third man lies face downward on the floor in line with and facing the first man. The third man places one elbow on the floor in front of himself. His forearm is vertical and his fist is clenched with the top parallel to the floor. His fist should be against his nose and level with his eyes. In this position his forearm is about 6 inches from the head of the first man. The first man, whose feet are being held, raises his head and trunk from the floor until his eyes are level with those of the third man. Then he returns to prone position. He continues this movement as many times as possible. The third man counts one for every time he sees the eyes of the first man.



## CHAPTER 7

### ACTIVITIES WITH SPECIAL EQUIPMENT

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#### Section I. EXERCISES WITH WEIGHTS

**80. GENERAL.** **a.** Muscular strength is developed most rapidly through progressive weight training. The usual equipment is an adjustable bar bell, or several bar bells graded in weight, and dumbbells of graded weights. Fixed-weight bar bells are preferred in this program, for they eliminate delays for adjustment. If regulation bar bells are not available, make substitutes by casting concrete on the ends of a pipe. Grade bar bells in 10-pound units from 30 to 120 pounds. Grade dumbbells in 5-pound units from 10 to 30 pounds.

**b.** Weight training may be used for all classes. Class 4 patients use only dumbbells, 3 to 15 pounds in weight. Class 3 patients use either bar bells or dumbbells, doing any exercise that does not interfere with their disabilities. Weight exercises are prohibited to Class 3 patients with post-operative conditions where muscles involved in the incisions would be used. When the medical officer approves weight training, the

instructor will see that the trainee does not use a weight too heavy for his condition. The trainee should use a weight which he can lift while maintaining normal breathing. Where the weight is no greater than half those used by the Class 1 trainee, and guarded limited movements are supervised, weight exercises can be carried out. The Class 2 and Class 1 trainee may progress rapidly.

**c.** Weight training should not be practiced more than three or four times a week. More frequent practice is likely to produce too much muscular soreness. Weight training should be alternated with other activities. Patients and trainees who are not in good condition should begin easily and not try to force development too rapidly. They should not try to lift a heavy weight for at least 2 weeks after beginning the activity. At first, they should be content with increasing the number of times they lift a submaximal weight. They should start with a weight that they can lift about 20 times. After becoming accustomed to the activity, they should progress to a weight

that they can lift only 6 or 8 times, and continue *with that weight* until they can lift it 20 times in succession. They may then progress to the next heavier weight and repeat the process.

**81. CONDUCTING WEIGHT EXERCISES.** a. Arrange trainees in the rotating gymnasium program so that men of about the same strength are together. This saves time, especially if bells of adjustable weights are used, for there is less need for weight changing.

b. There should be about four patients to a squad working with one bar bell or with two dumbbells. This type of activity is sufficiently strenuous so that there should usually be some rest between each two or three exercises. With four men working, there is a proper balance between work and rest.

c. In the exercises below, the movements are planned so that there are only two changes of weights with bar bells and one with dumbbells. A man starts with a weight that he can handle without too much strain. The initial weight of the bar bell should be from 20 to 50 pounds, according to the strength of the man. The initial weight of dumbbells should be from 5 to 20 pounds. With the bar bells approximately 50 percent is added to the weights after the third exercise, and another 50 percent after the seventh exercise. A man starting with a bar bell of 20 pounds, would change to 30

and 45 pounds, respectively. With the dumbbells, the weight should be doubled after the sixth exercise. If bells with adjustable weights are used, the smaller disks should be towards the inside, as the changes are usually large ones, and can easily be made by adding one of the larger disks to the outside on each side.

d. Where two exercises (2 and 2A) are given below, under one number, the second exercise is slightly more difficult than the first. In some instances, the coordination of the second is more difficult. Frequently the man will progress from the first of the two exercises to the second after the second or third week of weight training.

**82. TECHNIQUE.** a. The bell is grasped so that when it is held in front of the thighs, the palms are toward the thighs. This is called the "ordinary grasp." If the other, or "reverse grasp," is called for it will be so stated.

b. In almost all bar bell and dumbbell exercises, the feet are separated to about shoulder width.

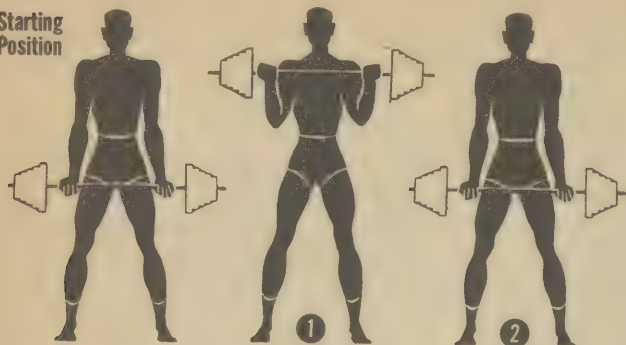
c. In weight training there should be no closing off of the breathing. The individual should usually inhale as the weights are lifted upwards, and exhale on the downward movement. It is important that this free breathing movement be maintained, so that the exercise will not interfere with the circulation.



**83. BAR BELL EXERCISES.**

*Initial weight of bells is from 20 to 50 pounds*

**Starting Position**

**EXERCISE 1: CURL**

**Starting position.** Holding bell in front of thighs with reverse grasp (palms forward).

**Movement.**

(1) Flex elbows slowly until bell is close to the upper chest.

(2) Recover to starting position.

Flex elbows fully on count (1) and straighten them fully on count (2). Do not move elbows back or jerk or sway body to aid movement. Repeat appropriate number of times. (See par 80c.)

**EXERCISE 2: HIGH PULL-UP**

**Starting position.** Bending down, with feet separated about shoulder width. Bell is held on the floor with ordinary grasp.

**Movement.**

(1) Lift bell rapidly to just above the height of the head.

(2) Return bell till it nearly touches the floor.

Keep back straight. Repeat appropriate number of times. (See par. 80c.)

**Starting Position**



Starting Position



1



2



3



4



## EXERCISE 2A: ALTERNATE LIFT AND PRESS

**Starting position.** Bell on floor as in exercise 2

**Movement.**

(1) Lift bell rapidly to the chest.

(2) Without a jump, press bell upward to the full overhead position.

(3) Lower bell rapidly to the chest.

(4) Recover to starting position.

Keep back straight throughout. Repeat appropriate number of times. (See par. 80c.)

Starting  
Position



### EXERCISE 3: SIDE BEND

**Starting position.** Bell resting behind neck. Feet are separated 2 feet.

#### **Movement.**

- (1) Bend to left.
- (2) Recover starting position.
- (3) Bend to right.
- (4) Recover to starting position.

Repeat from 10 to 15 movements each way.

Starting  
Position**EXERCISE 3A: TURN AND BEND**

**Starting position.** Holding bell in front of thighs. Feet are separated about 2 to 2½ feet.

**Movement.**

(1) Turn body to left, lowering bell to side of left ankle.

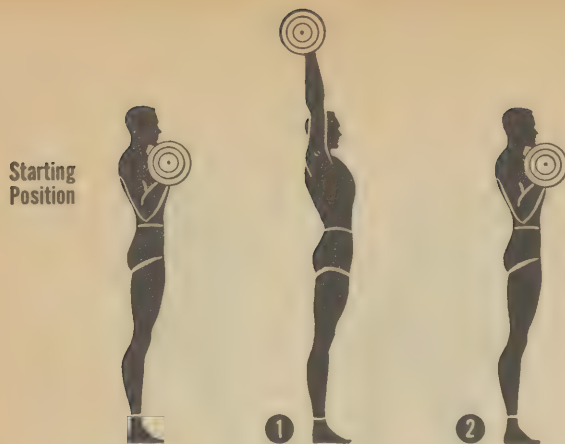
(2) Recover to starting position.

(3) Repeat count (1) for other side.

(4) Recover to starting position.

Keep back as flat as possible. Repeat appropriate number of times. (See par. 80c.)

*Weight of bell should now be increased 50 percent*



#### EXERCISE 4: MILITARY PRESS

**Starting position.** Holding bell just in front of chest, keeping palms forward.

**Movement.**

- (1) Thrust bell slowly upward to a position above the head.
- (2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.) (This exercise may also be started holding the bell behind the neck.)



#### EXERCISE 5: STIFF LEG DEAD LIFT

**Starting position.** Grasping bell in front of feet, keeping knees straight.

**Movement.**

- (1) Lift bell until body is vertical and bell is in front of thighs.
- (2) Lower bell as far as possible, *keeping knees straight*.

Repeat appropriate number of times. (See par. 80c.) (This exercise may be more advantageously performed while standing on a bench or platform.)



## EXERCISE 5A: TWO-HAND REPETITION SNATCH

**Starting position.** Standing close to the bell with feet slightly apart. Grasping bell *with hands wide apart*.

**Movement.**

(1) With a long and continuous pull, raise bell close to the chest. As the bell passes the face, "split"—one foot going forward with knee bent, and the other backward with the knee straight. At the same time extend arms fully over head.

(2) Straighten up, bringing feet together.

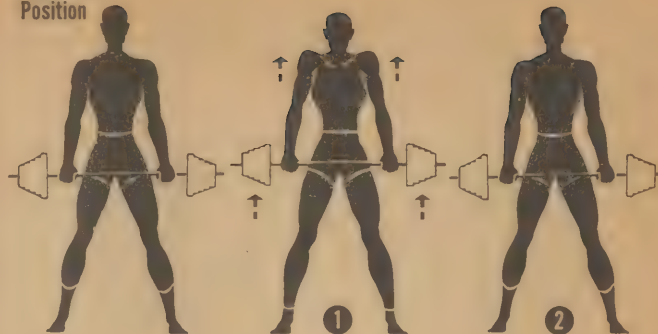
(3) Return bell to floor.

Repeat appropriate number of times.

(See par. 80c.)



Starting Position



## EXERCISE 6: SHOULDER SHRUG

**Starting position.** Holding bell in front of thighs, keeping palms toward body.

**Movement.**

(1) Without bending elbows, lift bell as high as possible by raising shoulders.

(2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

**EXERCISE 7: HALF-BEND ROWING MOTION**

**Starting position.** Bell raised from the floor. Knees and back are straight, but hips are bent so the trunk is inclined forward almost horizontally.

**Movement.**

(1) Flex arms pulling bell upward until bar touches the chest.

(2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

*Weight of bell should now be increased 50 percent*

**Starting  
Position**



**Starting  
Position**

**EXERCISE 8: ON TOES**

**Starting position.** Bell resting behind neck.

**Movement.**

(1) Rise on toes as high as possible.

(2) Recover to starting position.

Rise 10 times with toes turned in, 10 times with toes straight, and 10 times with toes turned slightly outward.

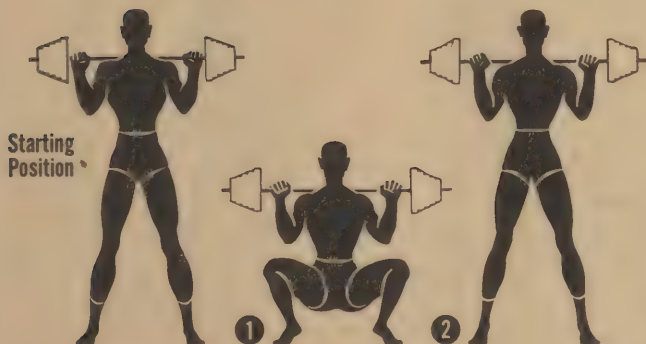
**EXERCISE 9: FULL SQUAT**

**Starting position.** Bell resting behind neck. Feet are 12 to 15 inches apart, toes are turned out.

**Movement.**

- (1) Squat completely down, keeping soles of feet flat on floor, and knees separated.
- (2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

**Starting Position****EXERCISE 10: HIGH RAPID DEAD LIFT**

**Starting position.** Bending down, with feet separated about shoulder width. Bell is held on floor with ordinary grasp.

**Movement.**

- (1) Lift bell very rapidly to height of chest.
- (2) Without pausing return bell till it nearly touches the floor.

Repeat appropriate number of times (par. 80c) without pausing between movements.

Starting  
Position



#### 84. DUMBBELL EXERCISES.

*Initial weight of bells is 5 to 20 pounds*

##### EXERCISE 1: BELLS SIDEWARD AND FORWARD-UPWARD

**Starting position.** Feet are shoulder-width apart. Bells are held at sides (palms are inward).

##### **Movement.**

- (1) Raise bells sideward to level of shoulders.
- (2) Recover to starting position.
- (3) Swing bells forward and upward to the vertical.
- (4) Recover to starting position.

Continuing alternating counts (1) and (2) with counts (3) and (4) for the appropriate number of times. (See par. 80c.)

**EXERCISE 2: CURL AND PRESS UPWARD**

**Starting position.** Holding bells at side in ordinary grasp.

**Movement.**

(1) Flex elbows, raising bells in front of shoulders.

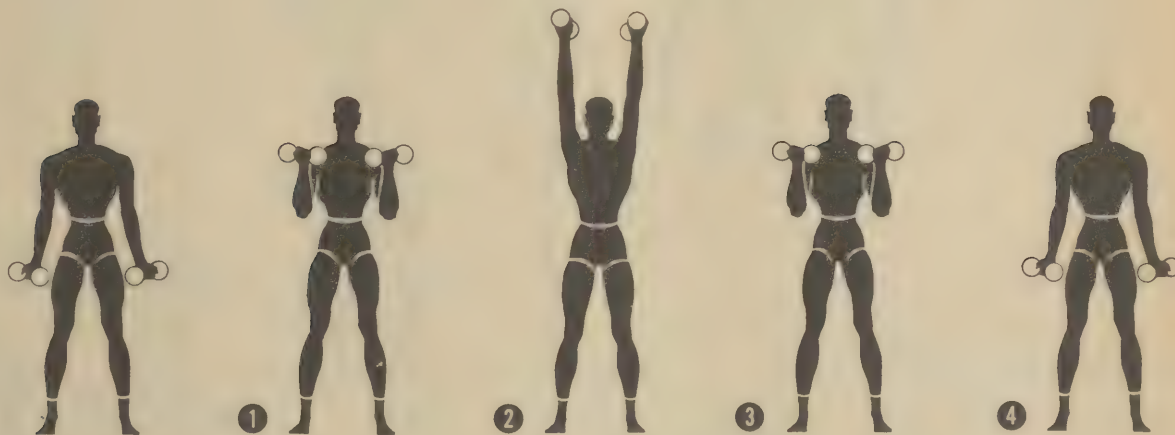
(2) Extend bells upward to the vertical.

(3) Flex elbows, lowering bells in front of shoulders.

(4) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

Starting  
Position





Starting  
Position**EXERCISE 3: STATIONARY RUN**

**Starting position.** Standing erect, arms at thrust.

**Movement.** Execute a stationary run, bringing knees up to level with the hips. Swing arms vigorously in the usual motions of running.

Continue for from 30 seconds to a minute.

**EXERCISE 4: LEANING SIDE SWING**

**Starting position.** Trunk bent forward, knees straight, back flat, and arms hanging naturally from the shoulders.

**Movement.**

(1) Swing bells sideward to shoulder level.

(2) Recover to starting position.

Keep head in line with trunk. Pull chin in. Repeat appropriate number of times. (See par. 80c.)



Starting  
Position

### EXERCISE 5: TURN AND BEND

**Starting position.** Feet apart, elbows flexed sideward and close to ribs. Bells are held by the sides of the shoulders.

**Movement.**

(1) Turn trunk to left, thrusting bells down to the floor just

outside the left ankle.

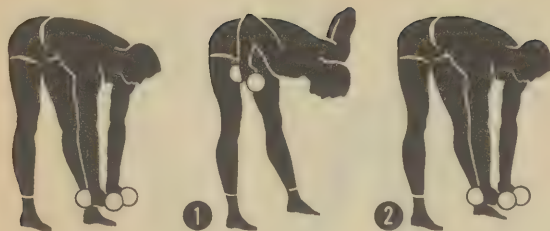
(2) Recover to starting position.

(3) Repeat count (1) to opposite side.

(4) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

Starting  
Position



## EXERCISE 6: ROWING

**Starting position.** Trunk bent forward, knees straight, back flat.

**Movement.**

- (1) Pull bells to the shoulders in a rowing movement.
- (2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

*Weight of the bells should now be doubled*

## EXERCISE 7: ON TOES

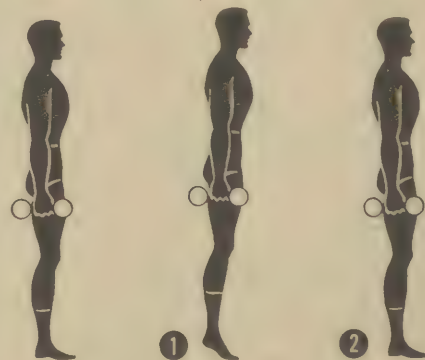
**Starting position.** Holding bells at sides.

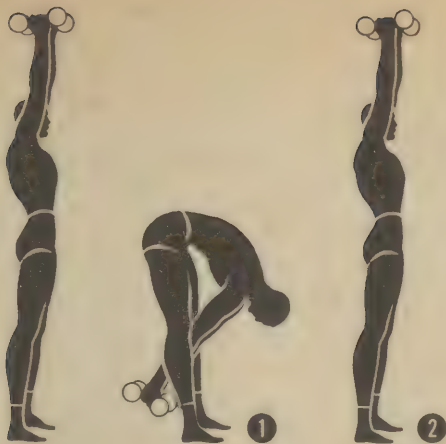
**Movement.**

- (1) Rise on toes as high as possible.
- (2) Recover to starting position.

As strength increases, rise on the toes of one foot at a time. Continue to rise on one foot until that leg is tired, then change to the other foot.

Starting  
Position



Starting  
Position**EXERCISE 8: SWING BETWEEN LEGS**

**Starting position.** Feet apart, bells extended overhead.

**Movement.**

- (1) Bend forward swinging bells between legs and backward. Knees straight.
- (2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

**EXERCISE 9: FULL SQUAT AND THRUST**

**Starting position.** Feet about 1 foot apart, bells extended overhead.

**Movement.**

- (1) Assume a full squat position. At the same time lower bells to a position at the shoulders.
- (2) Recover to starting position.

Until legs are strong enough, this exercise is best done with feet flat on the floor and toes turned out. After legs become stronger, it can be done in the usual way, raising the heels and squatting down on the toes. Repeat appropriate number of times. (See par. 80c.)

Starting  
Position

**Starting Position****EXERCISE 10: UPRIGHT ROWING MOTION**

**Starting position.** Standing erect, holding bells by side of thighs.

**Movement.**

- (1) Pull bells upward to front of shoulders, bringing elbows out.
- (2) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

**EXERCISE 11: CONTINUOUS SNATCH**

**Starting position.** Bending forward, grasping bells on floor in front of feet which are about shoulder width apart.

**Movement.**

- (1) Straighten up, pulling bells rapidly past the front of the body and up to a position of arms vertical.
- (2) Recover to starting position.

This exercise can be combined with a "split," as illustrated. Repeat appropriate number of times. (See par. 80c.)

**Starting Position**



**Starting Position****EXERCISE 12: FORWARD AND UP**

**Starting position.** Lying on back, arms out at the sides at right angles to the body.

**Movement.**

- (1) Swing bells overhead, above the chest.
- (2) Bring arms down alongside of head.
- (3) Repeat count (1).
- (4) Recover to starting position.

Repeat appropriate number of times. (See par. 80c.)

## Section II. SPRING EXERCISERS

**85. TYPES.** A spring exerciser has two handles connected with strong steel springs about 16 inches long. It may be used with a handle in each hand, or with one handle (or a stirrup) held down by one or both feet and the other handle pulled by a hand. If a double stirrup is used, springs will run from the stirrup to each handle. The feet are placed in the stirrups and both handles may be pulled by the hands. From one to six springs may be used. There is also a small spring grip exerciser made of small handles connected with a spring.

**86. VALUE.** Spring exercisers are used for strengthening the muscles of the arms, shoulder girdle, back, and some muscles of the thighs. They may be used to advantage by all classes of patients. Spring exercisers are particularly suited to the small-group program in the gymnasium or the ward.

**87. METHOD OF USING.** The instructors should prescribe the movements to be used by each man assigned to the spring exercisers. First the patient experiments to determine the number of springs he can profitably use for each prescribed exercise. Then he should arrange the exercises successively so that differ-

ent muscle groups are called upon. Exercises using the same number of springs will be grouped together; for example, if he can pull only one spring in two of the exercises, these two should come together. Springs should be added until the patient can do the exercises not over 10 to 15 times before he fatigues. Even after he has become strong, adding another spring frequently makes it difficult for him to pull more than once or twice. This is satisfactory, for the added effort strengthens muscles as well as, or better than, more movements with less resistance. The exercise should be repeated after a short rest. In the beginning, the regular exercises of a muscle group may be supplemented by returning to exercises with a smaller number of springs. The movement should not be too fast and the return movement should be slow enough to obtain resistance from the springs. Breathing should be regular. There should usually be an inhalation on each pulling movement and an exhalation on the return movement; that is, there should be no holding of the breath. Because of the varying needs and capacities of patients, the exercises below should not be administered in cadence to a whole group. Specific instructions for the exercises follow.

### 88. EXERCISES PRIMARILY FOR MUSCLES RETRACTING SHOULDER GIRDLE.



Starting Position

①



②

**EXERCISE 1:**

**Starting position.** Holding exerciser in front of body, with palms facing each other and arms forward and slightly outward.

**Movement.**

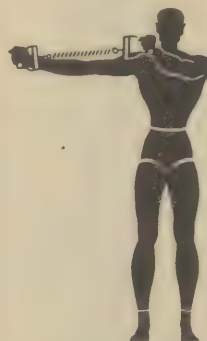
- (1) Swing steadily, but not too rapidly, horizontally to the side until the springs touch the chest. Do not raise shoulders.
- (2) Recover to starting position.

**EXERCISE 2:**

**Starting position.** Holding exerciser with stronger arm extended horizontally to the side and weaker arm extended horizontally to front.

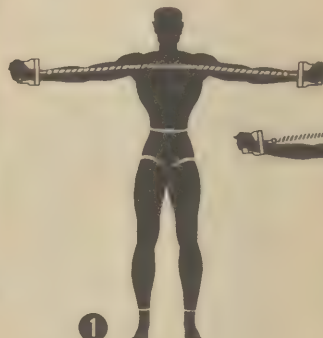
**Movement.**

- (1) Extend weaker arm horizontally to side.
- (2) Recover to starting position.

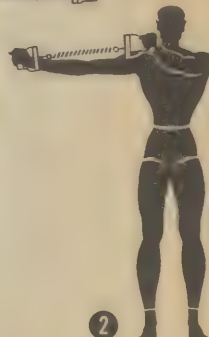


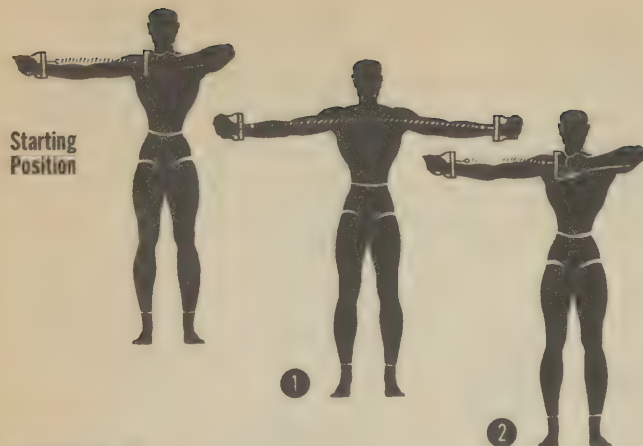
Starting Position

①



②





### EXERCISE 3:

**Starting position.** Standing like an archer about to shoot, with one arm extended horizontally to the side, and with the other arm, elbow flexed, out to the side, hand in front of shoulder.

#### **Movement.**

- (1) Straighten bent arm horizontally to the side as in exercise 2 above.
- (2) Recover to starting position.

This exercise should be done on each side. It is a strong exercise for the triceps muscles of the pulling side.

## 89. EXERCISES PRIMARILY FOR FRONTS OF SHOUL- DERS (anterior deltoid, coraco-brachialis).

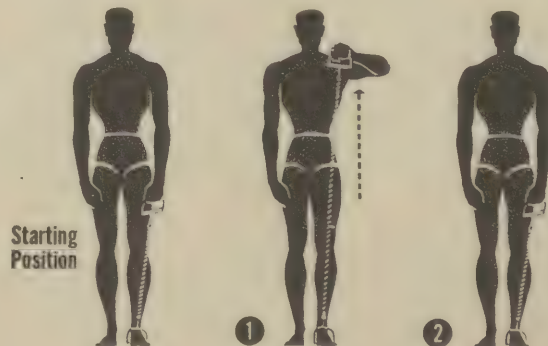
### EXERCISE 1:

**Starting position.** Standing with the left foot in one handle, and with palm of left hand down on the other handle.

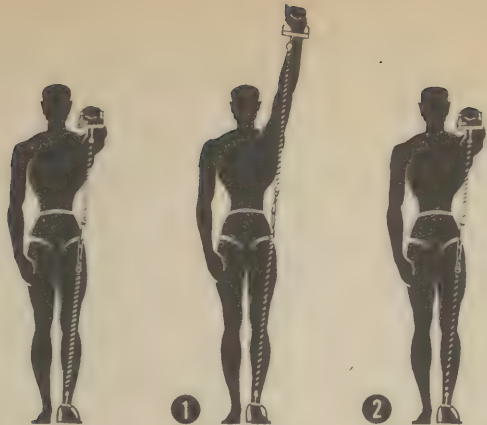
#### **Movement.**

- (1) Pull to the front horizontally or somewhat higher, using left hand.
- (2) Recover to starting position.

Repeat exercise for the other side. If stirrups are used, both hands pull at the same time.



Starting Position



## EXERCISE 2:

**Starting position.** Standing with the left foot in one handle of two lengths of springs hooked together end to end. Left arm extended forward shoulder high.

### Movement.

- (1) Swing left arm forward and upward to the vertical.
- (2) Recover to starting position.

Repeat exercise on the other side.

## 90. EXERCISE FOR BICEPS MUSCLE.

### EXERCISE 1:

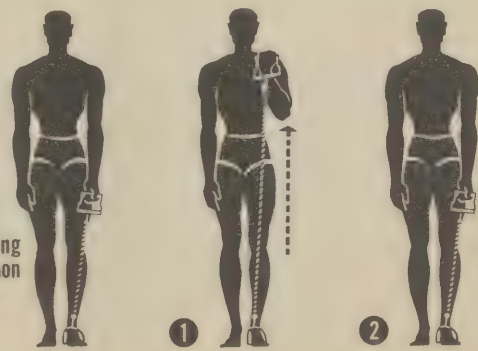
**Starting position.** Standing with a foot in one handle and the palm of the hand on the same side in the other handle. Palm is forward.

### Movement.

- (1) Pull forward, keeping elbow by the side until it is completely flexed and the hand is in front of the shoulder.
- (2) Recover to starting position.

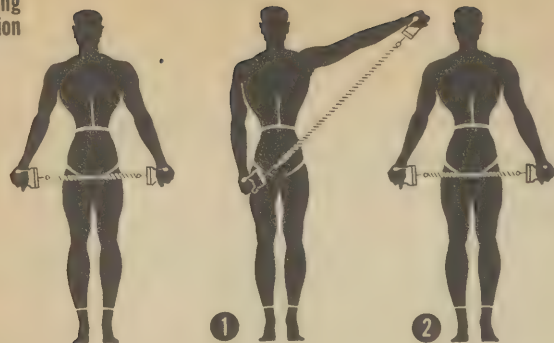
If stirrups are used, pull with both hands at once. Repeat exercise on the other side.

Starting Position





Starting  
Position



## 91. EXERCISES PRIMARILY FOR SIDES OF SHOULDERS (deltoid).

### EXERCISE 1:

**Starting position.** Holding exerciser behind hips, with palms facing.

**Movement.**

- (1) Hold left hand behind and against the left hip. Raise right arm to the right side horizontally or higher.
- (2) Recover to starting position.

Repeat exercise on the other side.

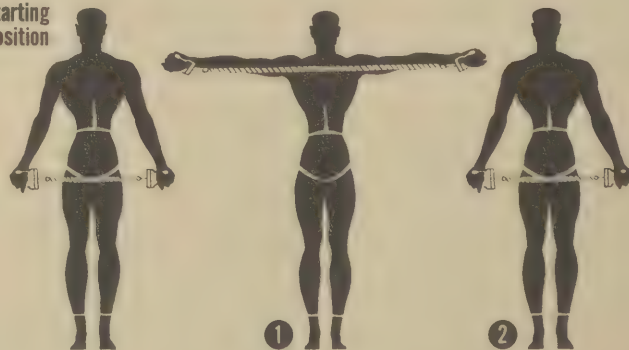
### EXERCISE 2:

**Starting position.** Holding exerciser behind hips, with palms facing.

**Movement.**

- (1) Raise arms horizontally to the side, or nearly to that position.
- (2) Recover to starting position.

Starting  
Position



Starting  
Position**EXERCISE 3:**

**Starting position.** Standing with one foot in one handle (or both feet in stirrups). Hand on same side in other handle.

**Movement.**

- (1) Raise other handle horizontally to side (if stirrups are used, raise handles horizontally to side with both hands).
- (2) Recover to starting position.

Repeat exercise on other side.

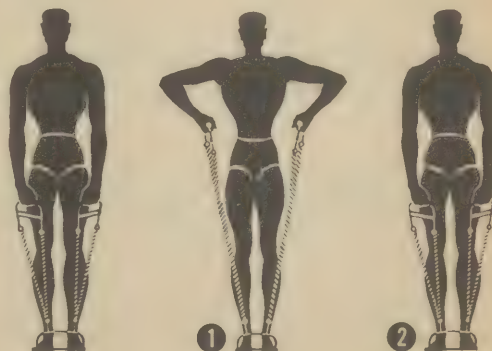
**EXERCISE 4:**

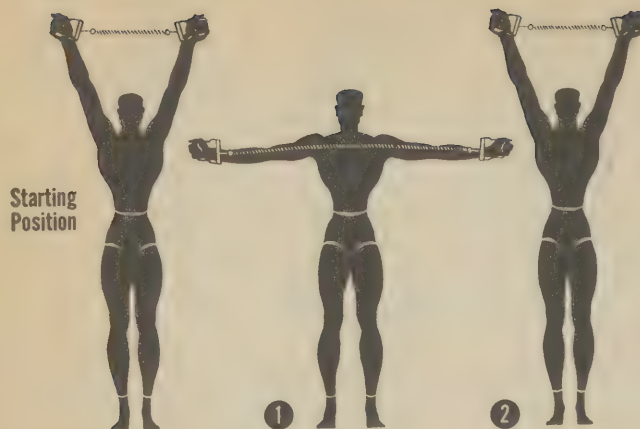
**Starting position.** Standing with both feet in stirrups and hands in handles of exerciser.

**Movement.**

(1) Pull hands in front of chest and shoulders, flexing elbows and raising them to the side. The pull is vertical, but the upper arms are raised outward in the middle position of the movement.

(2) Recover to starting position.

Starting  
Position



## 92. EXERCISES PRIMARILY FOR LATISSIMUS DORSI GROUP OF MUSCLES.

### EXERCISE 1:

**Starting position.** Arms upward and diagonally outward. Palms inward or outward.

**Movement.**

- (1) Pull arms downward horizontally to the side until the springs touch the front of the chest.
- (2) Recover to starting position.

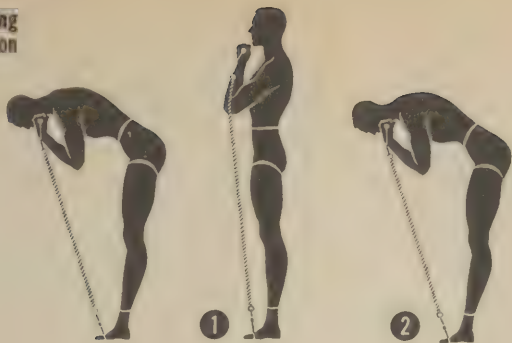
### EXERCISE 2:

**Starting position.** Standing in stirrups and leaning forward with toes turned out to permit springs to clear the legs.

**Movement.**

- (1) Pull handles backwards and upwards as far as possible.
- (2) Recover to starting position.



Starting  
Position

### 93. EXERCISES PRIMARILY FOR TORSO.

#### EXERCISE 1:

**Starting position.** Standing in stirrups and leaning forward with elbows flexed fully and handles immediately in front of shoulders.

#### Movement.

- (1) Straighten upward as far as possible.
- (2) Recover to starting position.

If elbows are flexed just to a right angle and handles are held out about 1 foot in front of shoulders, this movement is just as efficacious for the back, and also for the front of the shoulders.

**94. EXERCISES PRIMARILY FOR LEGS.** In general, other devices are more effective for leg development; hence spring exercisers should be used for leg exercises only on remedial cases, and then usually only for the weak leg.

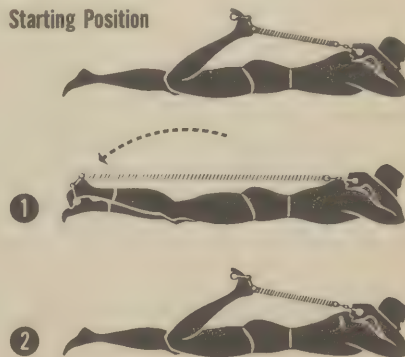
#### EXERCISE 1:

**Starting position.** Lying face downward on the mat, holding one handle behind the neck with both hands, and hooking the toes of the weak leg through the other handle. The knee of the weak leg is flexed backward.

#### Movement.

- (1) Extend lower leg.
- (2) Return lower leg to starting position.

Starting Position





## EXERCISE 2:

**Starting position.** One handle of the exerciser is attached near the floor. The patient is lying on his back with his strong leg the closer to the attached handle, and the toes of his weak leg hooked through the other handle of the exerciser.

### Movement.

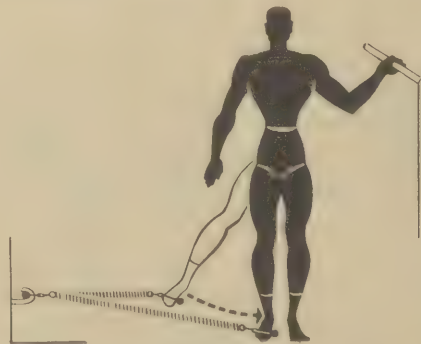
- (1) Pull weak leg to the outside as far as possible.
- (2) Recover to starting position.

## EXERCISE 3:

**Starting position.** Standing erect on the strong leg and holding to some object for balance. The weak leg which is abducted from the body is in one handle of the exerciser. The other handle of the exerciser is attached near the floor.

### Movement.

- (1) Pull weak leg next to strong leg against resistance of spring.
- (2) Recover to starting position.



**95. SPRING GRIP EXERCISES.** Hold grip exercisers in hands, and grip as many times as possible before halting because of fatigue.



### Section III. MEDICINE BALL EXERCISES

**96. VALUE.** The medicine ball is a leather ball varying from 10 to 14 inches in diameter and varying from 3 to 12 pounds in weight. The lighter balls should be used for Class 3 patients, the heavier balls for Class 1 and 2 trainees. Medicine ball exercises are very popular with patients and are used to strengthen the muscles of the arms and trunk. The exercises in paragraph 99 can be used by all patients of Classes 1, 2, and 3 providing they have no injuries (such as injured backs, wrists, elbows, or shoulders) which would contraindicate their use. Patients with recently healed abdominal wounds should not perform sitting exercises with the medicine ball.

**97. METHOD OF USING.** **a.** For many medicine ball exercises the most convenient formation is two lines of men facing each other. The two lines should be placed from 10 to 20 feet apart, depending on the particular throw to be practiced. The men in each line should be placed 6 or 8 feet apart. One ball should be assigned to each 2 or 4 or 6 men (1 or 2 or 3 men in each line). The ball is tossed back and forth between the lines.

**b.** For other activities the men are arranged 6 to 8 feet apart in a circle. For still other activities, the men are placed in two concentric circles, about 10 to 20 feet apart, with the men

in the outer circle about 10 feet apart. Class 3 patients using the medicine ball in the wards may stand between the beds, but may not throw over a bed patient.

**98. TECHNIQUE OF CATCHING BALL.** **a.** It is usually considered that exercise is obtained with the medicine ball by throwing it. However, *receiving* or *catching* the ball is equally significant and entails just as much exercise. The activity may be varied in many ways at the catching end. Some of the more common ways of catching the ball are listed below. It is assumed, of course, that the thrower tosses the ball to the indicated position:

In front of knees.

In front of waist.

In front of face.

Overhead.

Right (or left) side, waist high.

Right (or left) side, knee high.

Right (or left) side, head high.

The thrower must cooperate by throwing the ball to the position designated for the catch.

**b.** The activity may be further varied by throwing the ball at various speeds: slow, moderate, fast. The speed of the throw, of course, affects the dosage of exercise obtained by both the thrower and the receiver.

## 99. MEDICINE BALL EXERCISES (standing exercises).

### EXERCISE 1: CHEST PUSH

Ball is held in both hands at waist, raised to chest by flexing elbows, then pushed forward.



### EXERCISE 2: FORWARD THROW FROM BETWEEN LEGS

Ball is held in both hands in front of waist, swung down between legs, and then hurled forward.

### EXERCISE 3: OVERHEAD FORWARD THROW

Ball is held in both hands in front of waist, swung upward overhead, and then hurled forward.

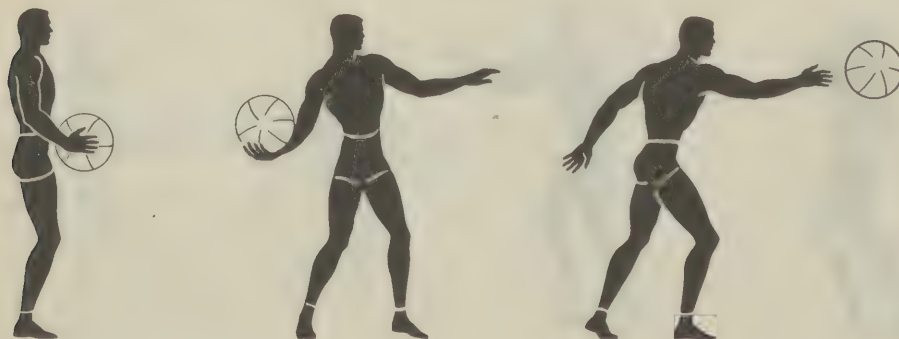


### EXERCISE 4: OVERHEAD SIDEWARD THROW

Ball is held in both hands at waist, swung sideward and upward to the right (left arm is across face and on top of ball), and then thrown forward by both hands.

# **EXERCISE 5:** **SIDEWARD THROW**

Ball is held in both hands in front of waist, swung to the right side, and then thrown forward by both hands.

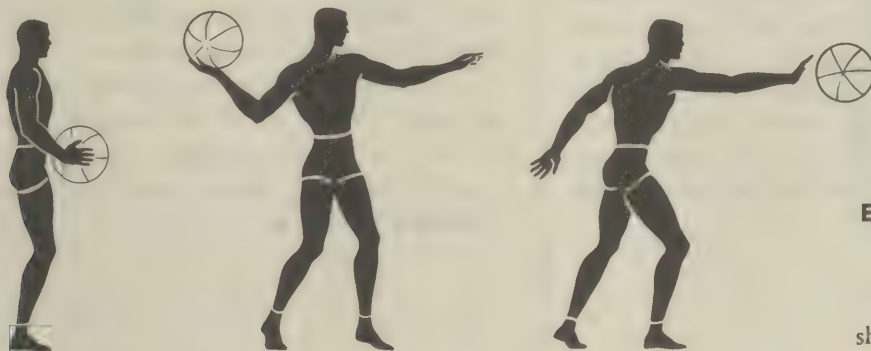


# **EXERCISE 6:** **ONE ARM THROW**

Ball is held in both hands at waist. Then it is shifted to right hand, swung to the right side, and hurled forward.

## EXERCISE 7: OVERHEAD THROW BACKWARD

Ball is held in both hands at waist (thrower's back toward receiver). Then it is swung downward between legs and hurled backward over head.



## EXERCISE 8: PUT WITH ONE ARM

Ball is held in right hand at shoulder, and then pushed forward.



## Section IV. BAG PUNCHING

**100. USE OF BAG PUNCHING. a. Value.** Bag punching is a popular activity with patients. It is an excellent exercise for developing strength and speed of movement of the muscles of the anterior trunk, arms, and shoulder girdle.

**b. Classes of patients.** Bag punching may be used for Classes 1, 2, and 3. Application of these exercises to specific classes is given in c below.

**c. Instructions.** A man should use appropriate gloves to protect his hands when punching the bag. If he wishes to punch the heavy bag violently, he should, in addition, wrap his hands with several yards of Ace-type bandages. After they have learned a few exercises, the patients should be encouraged to punch the bag by rounds. Class 2 trainees should punch the bag 2 minutes, rest 2 minutes, then punch another round. Class 1 trainees should punch the bag for 3 minutes, rest 1/2 minute, skip the rope 2 minutes, rest another 1/2 minute, and then punch the bag for 3 minutes. Patients should practice a new routine of exercises every 2 or 3 days in order to learn new skills. Specific instructions for exercises on the light and heavy bags follow.

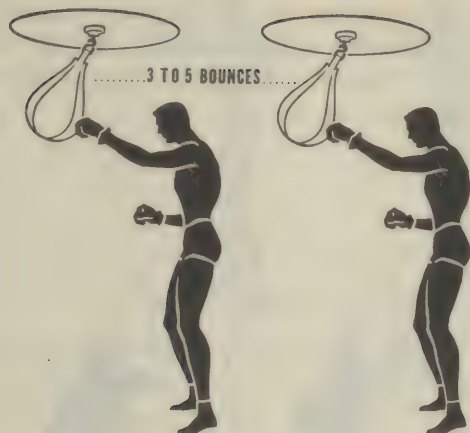
**101. LIGHT BAG. a.** The height of the bag should be such that the bulge of the bag is about level with the jaw. If the heights of the bags are fixed, there should be three platforms: one fixed at 6 feet, 5 inches for tall men; one at 6 feet, 1 inch for men of average size; and one at 5 feet, 9 inches for shorter men. In addition, there should be two platforms about 4 feet square and 3 inches high for men to stand on when punching a bag that is a bit too high for them.

**b.** The bag should be the larger and heavier type of the inflated punching bags. The heavy bag is easier to master than the light and provides just as satisfactory, or better, exercise.

**c.** The hands should be held as recommended for boxing. (See TM 21-220.) The bag is hit on the largest part of its bulge. The man should be told to "hit it in the equator," and hit straight through it, not up or down.

**d.** The foot position in straight-away hitting is the same as for boxing. When elbows and sideward hooks are used, the feet are in side-straddle position.

**e.** The following exercises are arranged in order of the difficulty of learning:

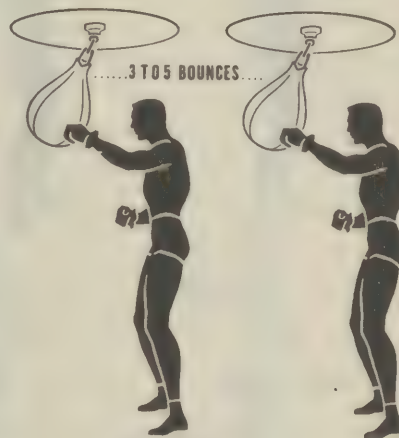


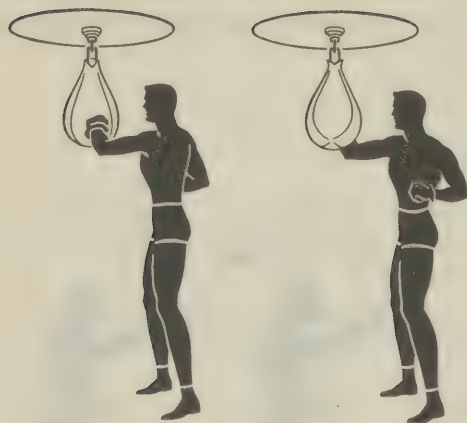
### EXERCISE 1: STRAIGHT LEAD

Stand in front of the bag and hit straight through the bag with the left hand. Let the bag bounce three to five times before the next hit. Repeat with right hand when left hand becomes fatigued. The hands may also be alternated.

### EXERCISE 2: DIAGONAL HOOK

Hit bag with a left hook blow about  $45^\circ$  to the opposite side. In other ways, this is the same as exercise 1 above.



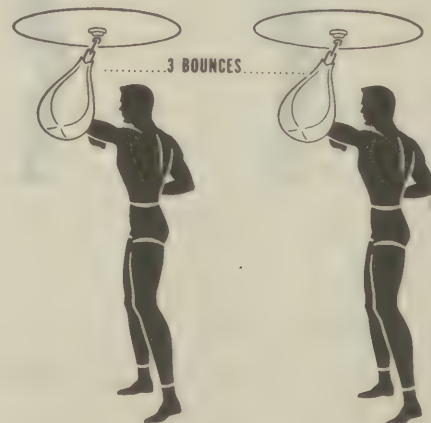


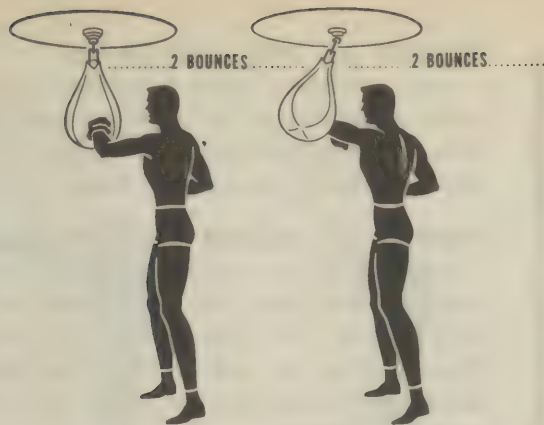
### EXERCISE 3: SIDE HOOK

Hit bag with a left hook blow direct to the right. Let bag bounce three to five times before next hit with left hand. Repeat with other hand to opposite side. Alternate hands allowing two to four bounces between blows.

### EXERCISE 4: ELBOW TO SIDE

Strike bag to the left with the left elbow. Let bag bounce three times, continue with same elbow. Repeat exercise for other elbow. Repeat with alternate elbows, allowing two bounces between each blow.



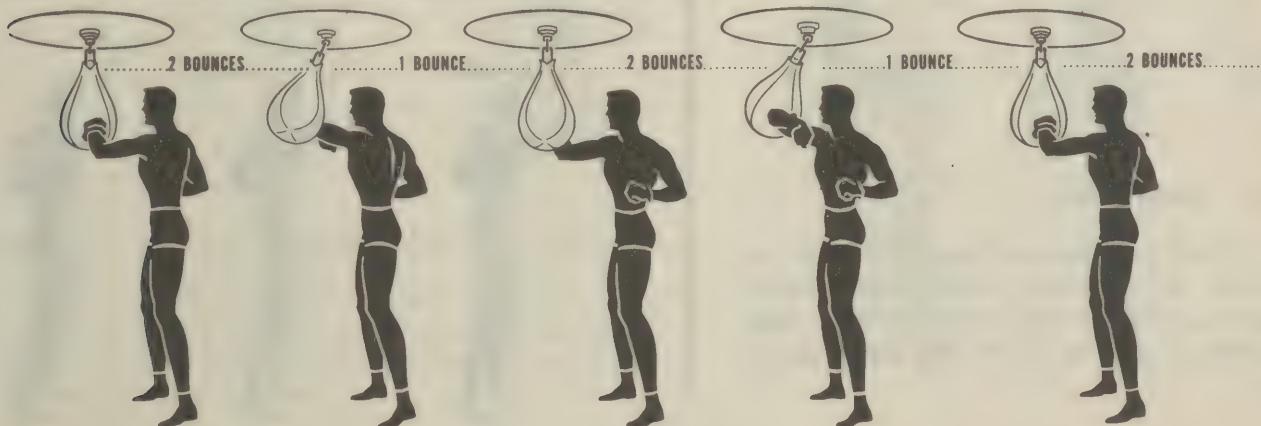


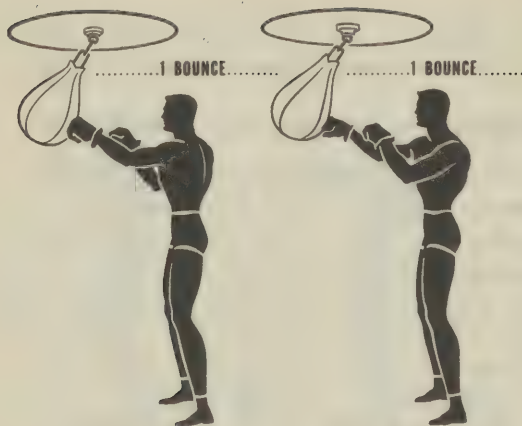
### EXERCISE 5: FIST AND ELBOW

Strike bag to right with left fist. Let bag bounce twice. Hit bag to the left with the left elbow. Let bag bounce twice, then repeat sequence. Repeat with right arm.

### EXERCISE 6: DOUBLE FIST AND ELBOW

First strike bag to right with left fist. Let it bounce twice. Strike it to the left with the left elbow. Let it bounce once. Strike to the left with the right fist. Let it bounce twice. Strike to the right with the right elbow. Let it bounce once. Then strike to the right with the left fist. Continue the action.





### EXERCISE 7: FRONT ROLL

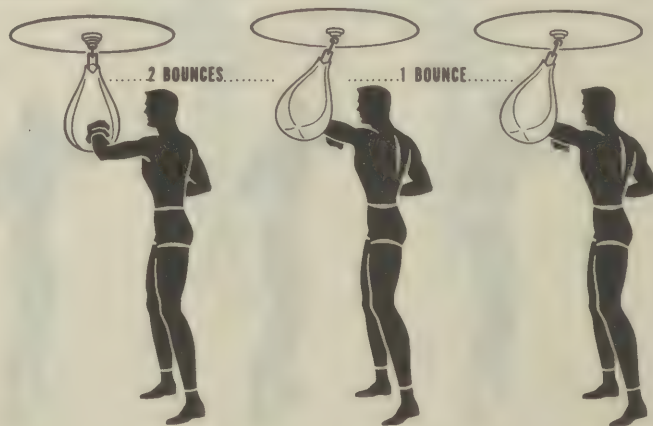
Hit bag forward with alternate hands, with only one bounce between hits. Hands are usually a bit beyond a perpendicular line below the swivel of the platform. Generally the hands roll one over the other in a sort of circular movement.

### EXERCISE 8: ONE HAND TATOO

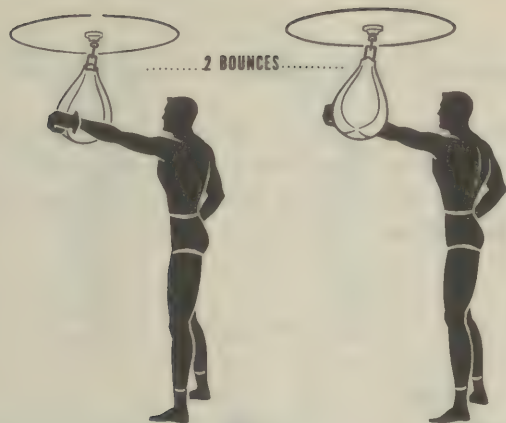
Same as exercise 7 above, except that the striking is done with one hand only and the exercise is more violent. Strike about 16 blows with one hand; change hands. Continue alternating hands after every 16 blows.

### EXERCISE 9: ALTERNATE ELBOWS TO SIDE

Strike bag to right with left fist and let bag bounce twice. After that, keep hitting the bag exclusively to the left with the left elbow, letting the bag bounce once between blows. Repeat exercise for right elbow. Then alternate elbows allowing two bounces between blows. This is excellent exercise for the trunk.





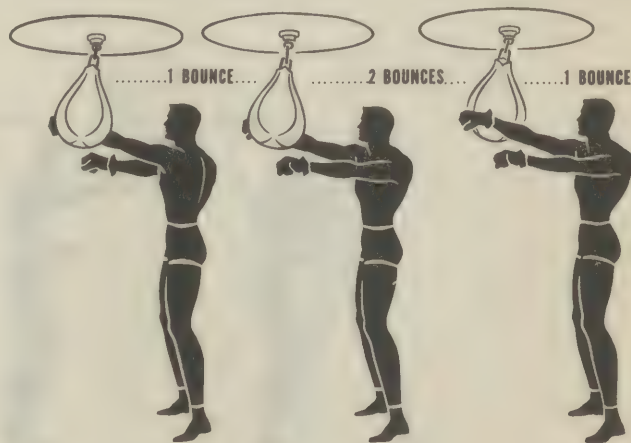


### EXERCISE 10: ONE FOREARM, LEFT AND RIGHT

The left forearm, with elbow straight, strikes the bag to the right. After the bag bounces two times, the same forearm strikes it to the left. Repeat, using the right forearm.

### EXERCISE 11: TWO FOREARMS DOUBLE TATOO

The left forearm hits bag to left. After bag bounces once, the right forearm hits it, also to the left. Let bag bounce twice. Hit it to the right with the right forearm. After one bounce, hit it again to the left with the left forearm. Continue alternating left and right.



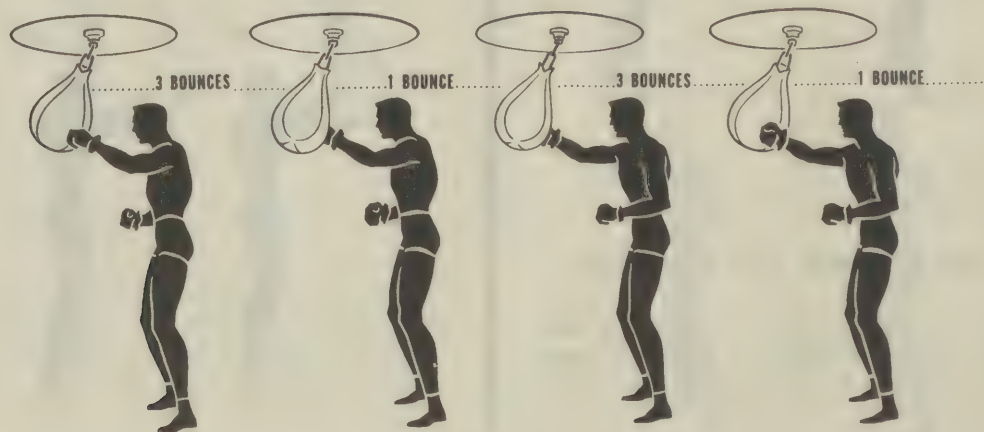
**EXERCISE 12: SLOW CROSS**

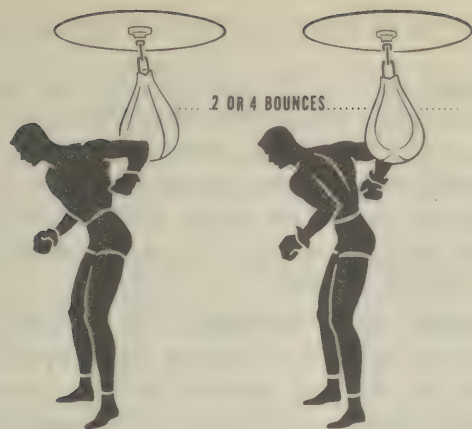
Strike bag 45° to the right with a left hook. Let bag bounce three times, and on the return after the third bounce, strike it 45° to the left with the back of the left hand. Let it bounce once. Strike it again to the left with the right hand. Let it bounce three times. Then strike to the right with the back of the right hand. Follow by a blow to the right with the left hand, etc. This is a difficult combination because it is hard to time. Try to strike the bag with the back of the hand ex-

actly at right angles to the intended direction of the hit. Hit the bag with the back of the fist, and not with the wrist.

**EXERCISE 13: FAST CROSS**

Same as exercise 12 above, except that the bag bounces only twice wherever it bounced three times in exercise 12. This is one of the most difficult exercises in bag punching if the action is at all fast.





#### EXERCISE 14: ELBOWS BEHIND

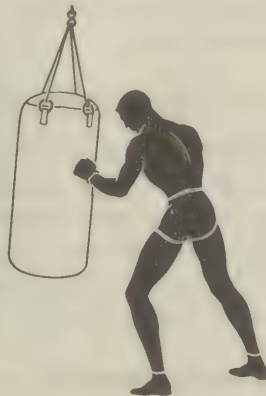
Stand with back to the bag and strike to the right with the left elbow behind the back. After bag bounces two or four times, follow with a similar blow to the left side with the opposite elbow.

#### EXERCISE 15:

After proficiency has been attained, practice fighting the bag. In this, try various combinations of blows such as exercises 1, 2, 3, 7, 8, 10, and 11 above. Continue this exercise for a full round.

**102. HEAVY BAG.** a. The heavy bag should be swung from a height of not over 15 feet; 10 or 12 feet is better. In punching the heavy bag, hold hands in the proper boxing position. If convenient, wrap the hands. Always use gloves. Simply practice the fundamental boxing blows on this bag; first one blow at a time until the technique has been fairly well learned, and then "mix them up."

b. In punching the heavy bag, the beginner should frequently stop the bag with one hand, while he prepares to strike with the other. This aids his judgment of distance, and helps prevent accidents to the striking hand. Try to hit



*through* or *into* the bag rather than hitting *at* the bag. That is, the blow should continue to exert strength for from 6 inches to 1 foot after it hits the bag. Back up the blow of the fist with a lot of body transfer. That is, let the body travel in the direction of the blow, and the upper trunk and shoulder snap forward into the punch. In punching the heavy bag, learn to strike with full force, and to lean into the blow.

c. After some experience has been acquired, learn to "fight the bag" as in shadow boxing; do not stop it with the opposite hand. Dance around the bag, advance, retreat, and hit it with a variety of blows, continuing for a full round. Give as much attention to good footwork as to blows. Rest 1 minute. Repeat for two more rounds with 1 minute rest between rounds. If it is necessary to alternate with another man, skip rope while the alternate is punching the bag.

## Section V. ROPE SKIPPING

**103. USE OF ROPE SKIPPING.** a. **Value.** Rope skipping is used to develop strength of the legs and cardio-respiratory endurance. It may be used for all ambulant patients who have arms and one leg in good condition.

b. Specifications of rope. Use soft cotton braided rope which is 9 feet long and  $\frac{3}{8}$  inch in diameter, and has handles.

**104. TECHNIQUE OF ROPE SKIPPING.** a. The rope

should be swung mainly with a wrist motion, even when arms are crossed.

b. The jump should be just high enough for an easy clearance. As the jumper becomes more expert in his timing and accuracy, he will avoid jumping higher than necessary.

c. In double swings, the rope should be swung very rapidly and *continuously*; that is, the jumper should not slacken the speed of the swing at the end of the second swing, and be forced to accelerate it again.

**105. TEACHING ROPE SKIPPING.** The instructor should place the men in open order formation, demonstrate the exercise, explain any important points to be kept in mind, and then let each individual practice at will. The instructor should move about to aid the men having difficulties in learning the activity.

**106. TYPES OF JUMPS.** a. Jumps, both feet.

b. Hops, one foot.

c. Running step (like stationary run).

d. Hop-run. Two hops on each foot, foot is changed after the second hop.

e. Hop-skip. One foot hops, and then hops a second time while the other foot is swung forward. Forward foot then hops twice while the other foot moves backward on the first hop, then forward on the second hop. The exercise is continued, with feet alternated.

**107. VARIATIONS.** Most of the above types of jumps may be executed in any of the following ways:

**EXERCISE 1: FORWARD SINGLE SWINGS OF ROPE**

Pass rope forward above head and backward under feet. There is one jump, hop, or running step to every swing of the rope.

**EXERCISE 2: BACKWARD SINGLE SWINGS OF ROPE**

The reverse of exercise 1 above.

**EXERCISE 3: FORWARD ALTERNATE SWINGS**

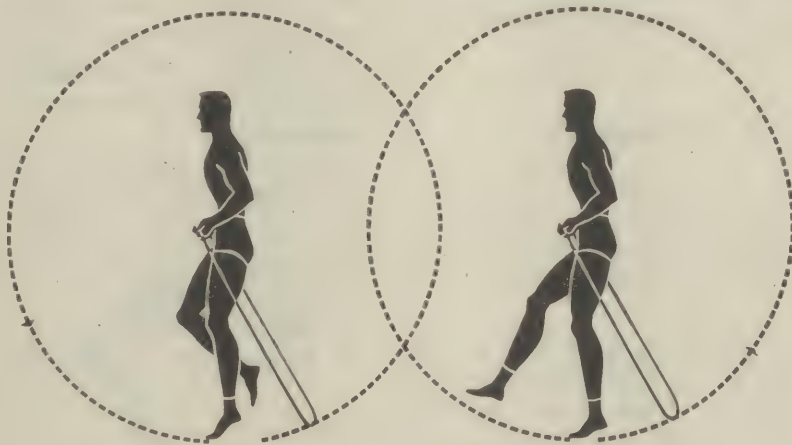
Pass rope forward above head and backward under feet. There are two foot movements to one swing; for example, there are two jumps (hops, running steps) upward, during only one of which the rope passes under feet.

**EXERCISE 4: BACKWARD ALTERNATE SWINGS**

The reverse of exercise 3 above.



HOPS, ONE FOOT



HOP-SKIP



CROSSING



**EXERCISE 5: FORWARD DOUBLE SWINGS**

Jump high enough and swing the rope forward above head fast enough for it to pass backward under feet twice during every jump (usually practiced only with jumps).

**EXERCISE 6: BACKWARD DOUBLE SWINGS:** The reverse of exercise 5 above.

**EXERCISE 7: CROSSING:** In this type, swing the rope (forward or backward) in the regular way on one swing, then cross arms in front of chest on the next swing. All alternate swings are made with arms crossed.

**Section VI. STALL BAR EXERCISES**

**108. USE OF STALL BARS.** a. Stall bars provide a means of giving rather heavy exercises to specific parts of the body and are excellent for correcting certain types of defects. Stall bars should be used for patients and trainees in Classes 3, 2, and 1.

b. The exercises should be selected and prescribed for the specific disabilities of the patients. They must be practiced in as good form as possible. The chest should be kept high, the head erect and when possible, the lower back should be kept flat or flexed forward, not hyperextended.

**109. STALL BAR EXERCISES.** The following exercises are arranged according to the parts of the body exercised, and in approximate order of severity of dosage:

**a. Exercises primarily for arms and shoulders.****Flexors****EXERCISE 1:**

**Starting position.** Standing on bottom rung of stall bar, feet together, body straight; grasping rung with both hands, palms down, at a height of 6 inches above waist.

**Movement.**

- (1) Press back from the stall bar by extending arms until straight.
- (2) Recover to the original position by pulling with the arms and flexing elbows.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 2:**

**Starting position.** Standing erect, feet together, at arm's length from stall bar; grasping rung at a height of 6 inches above waist.

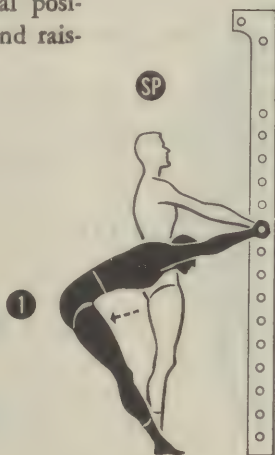
**Movement.**

(1) Bend forward until head is between extended arms. Thrust hips backward as far as possible. Keep knees straight.

(2) Recover to the original position by pulling with arms and raising trunk.

(3) Repeat count (1).

(4) Repeat count (2).

**EXERCISE 3:**

**Starting position.** Squatting on bottom rung and grasping the rung above the head.

**Movement.**

(1) Retaining grasp with hands, straighten legs. Thrust hips backward as far as possible.

(2) Bend knees and lower trunk to starting position.

(3) Repeat count (1).

(4) Repeat count (2).

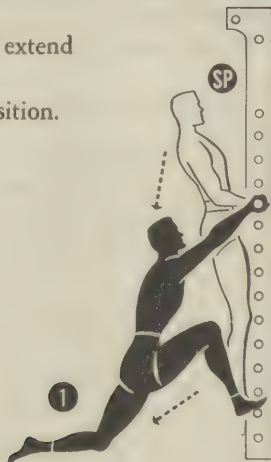


**EXERCISE 4:**

**Starting position.** Standing erect on second rung, grasping rung immediately in front of waist.

**Movement.**

- (1) Lower the body backward until arms are straight. At same time extend left leg to the rear, touching toe to floor as far to rear as possible.
- (2) Recover to starting position by pulling with arms.
- (3) Repeat count (1) but extend right leg to rear.
- (4) Recover to starting position.

**EXERCISE 5:**

**Starting position.** Standing on bottom rung with feet apart, grasping rung in front of waist. Trunk is extended backward away from the bar.

**Movement.**

- (1) Lower the body away from the stall bar, retaining grasp with left hand. At the same time turn the trunk to the right and, leaning backward, touch the right hand lightly to the floor.
- (2) Pulling with left arm, recover to the starting position.
- (3) Repeat count (1) on opposite side.
- (4) Repeat count (2).



**EXERCISE 6:**

**Starting position.** Hanging from top rung of stall bar with back to bar, palms facing backward.

**Movement.**

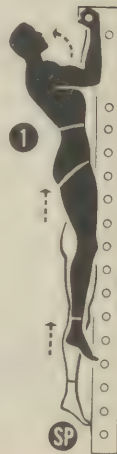
- (1) Retaining grasp with hands, turn body to the left as far as possible.
- (2) Recover to starting position.
- (3) Repeat count (1) on opposite side.
- (4) Repeat count (2).

**EXERCISE 7:**

**Starting position.** Facing stall bar, grasping top rung, palms facing outward.

**Movement.**

- (1) Pull body up with arms until chin is above top rung.
- (2) Lower body to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



## Extensors

## EXERCISE 8:

**Starting position.** Standing erect at arm's length from stall bar, feet together; hands grasping rung about 6 inches above waist.

**Movement.**

- (1) Bend arms and lean toward stall bar, touching chest to bar. Keep body straight.
- (2) Push away with arms and recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



## EXERCISE 9:

**Starting position.** Standing with left side of body at arm's length from the bar; grasping rung at height of shoulder with left hand.

**Movement.**

- (1) Bend the left arm and lean toward stall bar, touching left shoulder to bar.
- (2) Push away from the bar and recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the number of repetitions on each side.



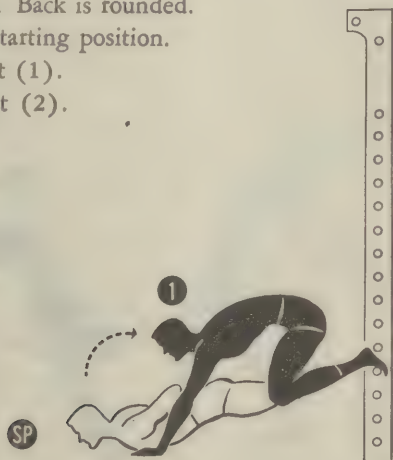


## EXERCISE 10:

**Starting position.** The body is extended from the stall bar with the weight resting on the hands. Toes are hooked over the fourth rung of the bar. Chest touches the floor lightly.

**Movement.**

- (1) Extend arms and bend knees, at the same time pull body in toward the stall bar. Back is rounded.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

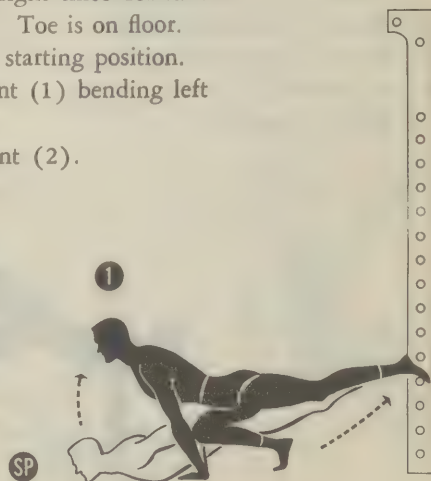


## EXERCISE 11:

**Starting position.** The body is extended from the stall bar with the weight resting on the hands. Toes are hooked over the fourth rung of the bar. Chest touches the floor lightly.

**Movement.**

- (1) Extend arms and at the same time bend the right knee forward under the body. Toe is on floor.
- (2) Recover to starting position.
- (3) Repeat count (1) bending left leg forward.
- (4) Repeat count (2).

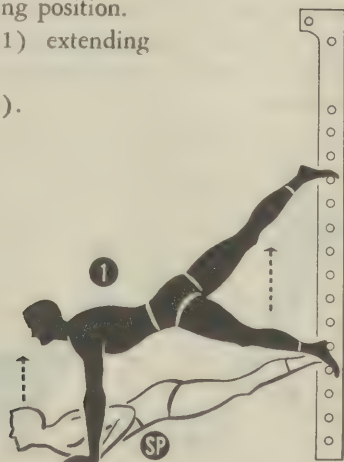


**EXERCISE 12:**

**Starting position.** The body is extended from the stall bar with the weight resting on the hands. Toes are hooked over the fourth rung of the bar. Chest touches the floor lightly.

**Movement.**

- (1) Extend arms and at the same time extend the right leg upward.
- (2) Recover to starting position.
- (3) Repeat count (1) extending left leg upward.
- (4) Repeat count (2).

**EXERCISE 13:**

**Starting position.** Assuming the front-leaning rest position with toes hooked over the ninth rung.

**Movement.**

- (1) Bend body upward at the waist by flexing the hips.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**b. Exercise for stretching upper chest and spine.**

**EXERCISE 1:**

**Starting position.** Facing away from the stall bar, reaching back over shoulders, and grasping rung with palms up. The body is erect and feet are together.

**Movement.**

(1) Step forward with left foot, arch back, thrust chest forward, straighten arms, and stretch neck upward and backward.

(2) Recover to the starting position.

(3) Repeat count (1) stepping forward with right foot.

(4) Recover to starting position.



**c. Exercises for extensors of legs.**

**EXERCISE 1:**

**Starting position.** Standing on the bottom rung and grasping bar at height of chest, body leaning backward with arms straight.

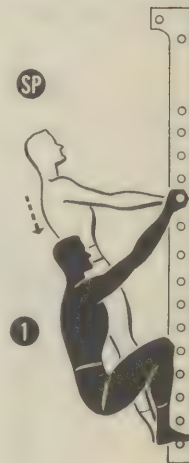
**Movement.**

(1) Squat down as far as possible continuing to lean backward. Hands continue to grasp the bar and arms are straight.

(2) Recover to the starting position.

(3) Repeat count (1).

(4) Repeat count (2).

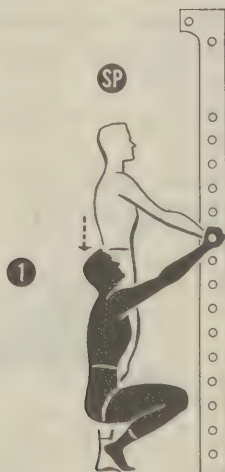


**EXERCISE 2:**

**Starting position.** Standing erect, facing stall bar. Arms are straight and hands grasp the bar at the height of the waist.

**Movement.**

- (1) Squat down on toes, retaining grasp on bar.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 3:**

**Starting position.** One man faces stall bar, holding rung about 6 inches above his waist and keeping his arms straight. His partner stands on his shoulders, holding top rung of stall bar.

**Movement.**

- (1) Both men execute a quarter squat simultaneously.
- (2) Each man straightens legs and returns to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 4:**

**Starting position.** One man faces stall bar, holding rung at shoulder height, keeping his arms straight. His partner sits on his shoulders with hands on hips.

**Movement.**

- (1) The bottom man executes a quarter squat.
- (2) The bottom man straightens legs and returns to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**d. Exercises for muscles of abdomen and thigh flexors.**

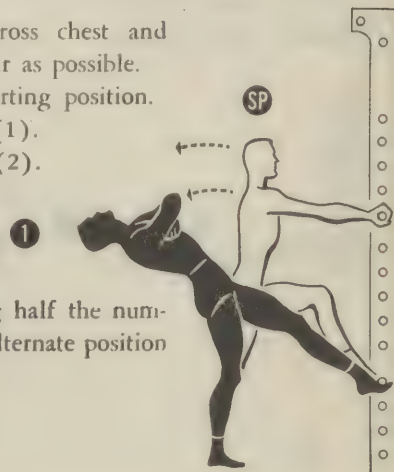
**EXERCISE 1:**

**Starting position.** Standing erect, facing stall bar. Hands grasp rung at height of chest. Arms are straight. The left toe is hooked under fourth or fifth rung.

**Movement.**

- (1) Fold arms across chest and lean backward as far as possible.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

After performing half the number of repetitions, alternate position of legs.



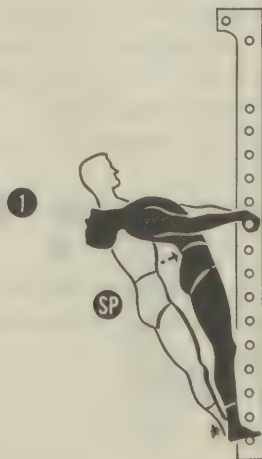


**EXERCISE 2:**

**Starting position.** Standing on bottom rung, holding rung at shoulder height, and leaning backward, keeping body in straight line.

**Movement.**

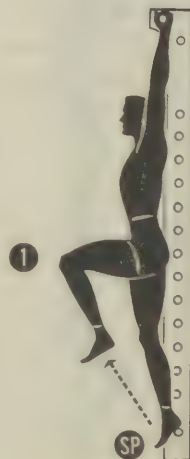
- (1) Arch back and lower head backward as far as possible.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 3:**

**Starting position.** Facing away from stall bar, grasping top rung with palms forward. Heels are resting on a lower rung.

**Movement.**

- (1) Raise left leg upward until thigh is at height of waist.
- (2) Return left leg to starting position.
- (3) Repeat count (1) with right leg.
- (4) Repeat count (2) with right leg.



**EXERCISE 4:**

**Starting position.** Facing away from stall bar, grasping top rung with palms forward. Heels are resting on a lower rung.

**Movement.**

- (1) Raise both knees until thighs form a right angle to trunk. The knees are flexed.
- (2) Lower legs to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 5:**

**Starting position.** Facing away from stall bar, grasping top rung with palms forward. Heels are resting on a lower rung.

**Movement.**

- (1) Raise legs until they form a right angle to trunk. Keep knees straight.
- (2) Lower legs to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 6:**

**Starting position.** Hanging from the highest rung of the stall bar, facing outward. Palms are turned forward.

**Movement.**

- (1) Keeping knees straight and twisting trunk to left, raise legs upward until they are perpendicular to trunk. Twist legs as far to the left as possible.
- (2) Recover to starting position.
- (3) Repeat count (1) on the right side.
- (4) Recover to starting position.

**EXERCISE 7:**

**Starting position.** Facing away from stall bar, standing erect on one of the lower rungs, and holding the top rung with palms forward.

**Movement.**

- (1) Raise left leg forward to a position perpendicular to the body.
- (2) Recover to starting position.
- (3) Repeat count (1) with right leg.
- (4) Repeat count (2).

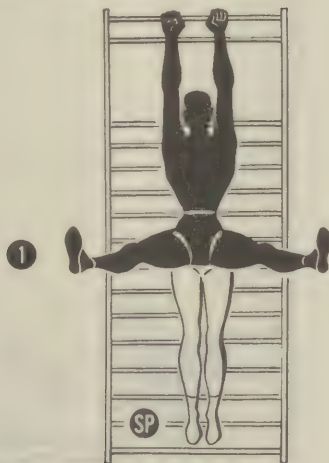


**EXERCISE 8:**

**Starting position.** Hanging from the top rung of the stall bar, facing outward. Palms are turned forward.

**Movement.**

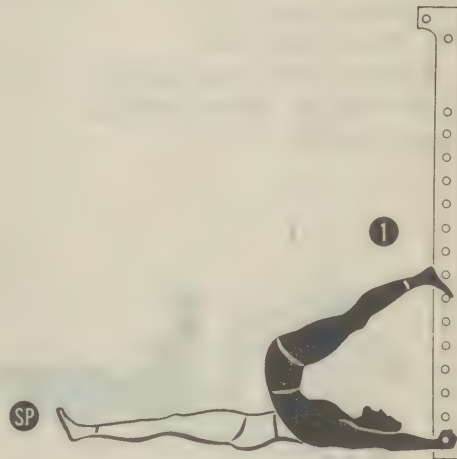
- (1) Raise feet perpendicular to body and spread legs as wide apart as possible.
- (2) Bring legs together and return to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 9:**

**Starting position.** Lying on back, grasping bottom rung of stall bar, keeping arms straight.

**Movement.**

- (1) Raise legs upward and overhead until toes touch stall bar.
- (2) Lower legs to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



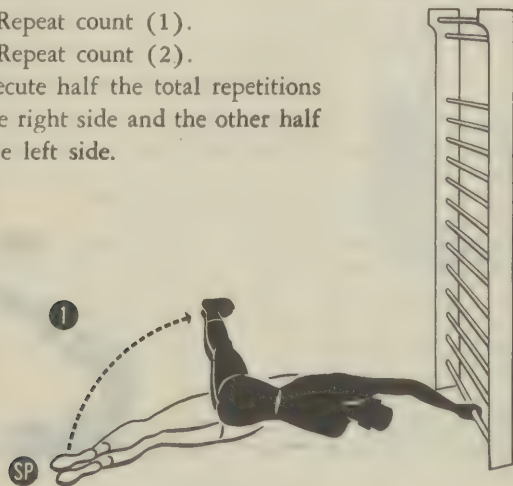
**EXERCISE 10:**

**Starting position.** Lying on the right side, perpendicular to the stall bar, with the left hand holding the bottom rung.

**Movement.**

- (1) Swing both legs forward to a position perpendicular to the trunk.
- (2) Return the legs to the starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total repetitions on the right side and the other half on the left side.

**EXERCISE 11:**

**Starting position.** Lying on the back with toes hooked inside the bottom rung of the stall bar.

**Movement.**

- (1) Sit up and touch toes.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



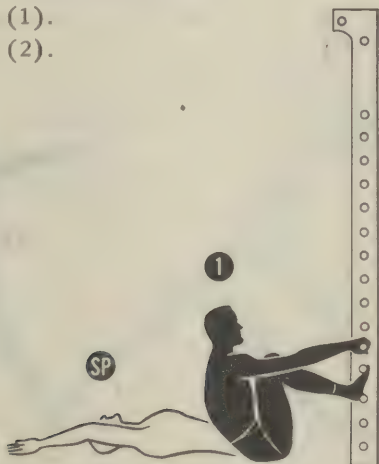


**EXERCISE 12:**

**Starting position.** Lying on back with the toes hooked under the fourth rung of the stall bar. Thighs are perpendicular to the floor.

**Movement.**

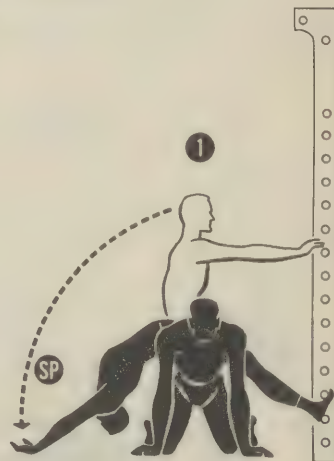
- (1) Sit up and, rounding the back, touch the stall bar with the hands.
- (2) Lower the trunk to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 13:**

**Starting position.** Two men are required for this exercise. One kneels parallel with the stall bars, the other sits on his back with toes hooked in one of the bottom rungs.

**Movement.**

- (1) The top man lowers his trunk backward as far as possible.
- (2) The top man raises his trunk and touches the stall bar.
- (3) Repeat count (1).
- (4) Repeat count (2).

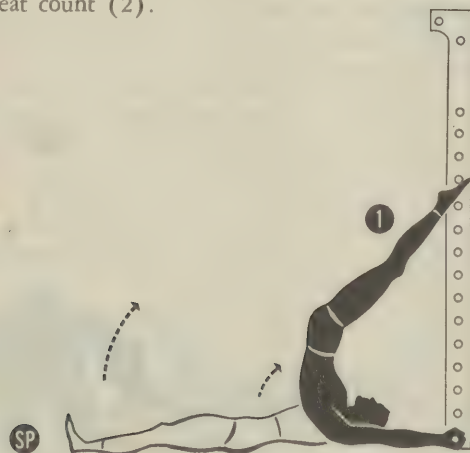


**EXERCISE 14:**

**Starting position.** Lying on back, grasping bottom rung of stall bar, keeping arms straight.

**Movement.**

- (1) Raise legs overhead and touch stall bar as high as possible. Keep knees straight throughout.
- (2) Lower legs to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

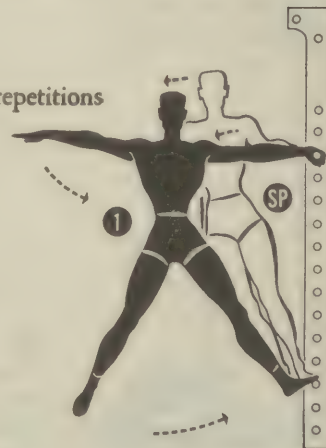
**EXERCISE 15:**

**Starting position.** Standing on third rung, feet together, left side to stall bar; left hand holding bar.

**Movement.**

- (1) Extend left arm, moving body away from bar. Raise right arm shoulder height and stretch right leg as far to the right as possible.
- (2) Pull back to the starting position with the left arm.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total repetitions on each side.



## e. Exercises for muscles of sides of trunk.

**EXERCISE 1:**

**Starting position.** Left foot on the second rung of the stall bar; left hand is grasping a lower rung and right hand an upper rung.

**Movement.**

(1) Extend the right leg to the rear in line with the trunk and right arm. The right foot does not touch the floor.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Repeat count (2).

Execute half the total repetitions on each side.

**EXERCISE 2:**

**Starting position.** Executing a side-leaning rest with the left hand grasping the bottom rung of the stall bar. The right hand is on the right hip.

**Movement.**

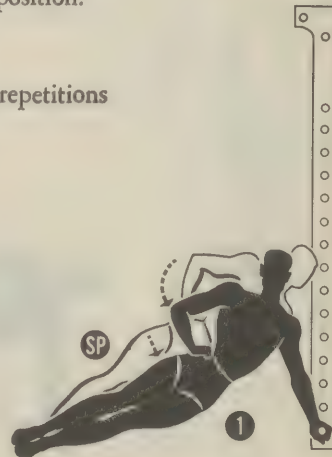
(1) Lower the left hip as far as possible without touching thighs to floor.

(2) Recover to starting position.

(3) Repeat count (1).

(4) Repeat count (2).

Execute half the total repetitions on each side.



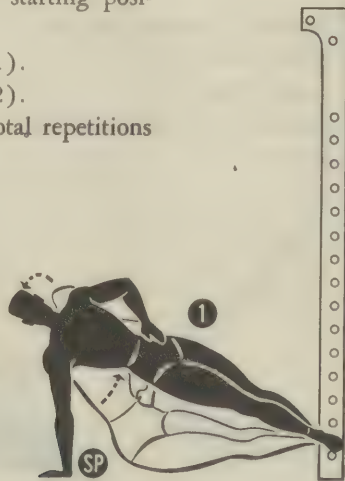
**EXERCISE 3:**

**Starting position.** Sitting on right thigh with feet over bottom rung. Trunk is leaning backward and weight is resting on right arm.

**Movement.**

- (1) Straighten body to side-leaning rest position by rotating and raising hips and thighs.
- (2) Lower body to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total repetitions on each side.

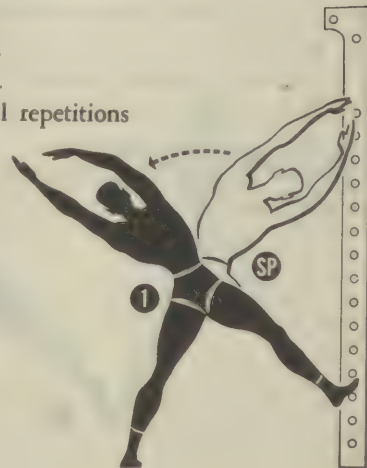
**EXERCISE 4:**

**Starting position.** Executing a side bend to the left, with left side facing stall bar and left foot on third rung. Arms are extended overhead.

**Movement.**

- (1) Bend the trunk straight to the right side as far as possible.
- (2) Bend the trunk to the left side to the starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total repetitions on each side.



**EXERCISE 5:**

**Starting position.** Left side facing the stall bar; left hand is grasping a rung below the waist and right hand a rung above the head.

**Movement.**

(1) Swing body off the floor to the right, supporting the weight by the arms. Keep legs straight and together.

(2) Recover to the starting position.

(3) Repeat count (1).

(4) Repeat count (2).

**f. Exercises for back muscles.****EXERCISE 1:**

**Starting position.** Facing the stall bar and standing on one of the lower rungs. Hands grasp the top rung with palms forward.

**Movement.**

(1) Flex the knees and raise the legs backward.

(2) Return the legs to the starting position.

(3) Repeat count (1).

(4) Repeat count (2).





**EXERCISE 2:**

**Starting position.** Facing the stall bar and standing on one of the lower rungs. Hands grasp top rung with palms forward.

**Movement.**

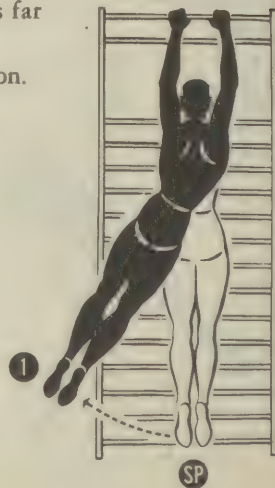
- (1) Spread the legs as wide apart as possible.
- (2) Return legs to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 3:**

**Starting position.** Facing the stall bar and standing on one of the lower rungs. Hands grasp top rung with palms forward.

**Movement.**

- (1) Swing both legs to the left as far as possible.
- (2) Return legs to starting position.
- (3) Swing both legs to right as far as possible.
- (4) Recover to starting position.



**EXERCISE 4:**

**Starting position.** Facing the stall bar in a sitting position with toes resting on bottom rung and hands resting on floor behind hips.

**Movement.**

- (1) Raise to back-leaning rest position by placing weight on hands and feet and straightening body. At the same time raise left thigh upward toward the trunk and bend knee.
- (2) Recover to the starting position.
- (3) Repeat count (1) but raise right thigh.
- (4) Recover to starting position.

**EXERCISE 5:**

**Starting position.** Facing stall bar in a sitting position with toes on bottom rung and hands on floor behind hips.

**Movement.**

- (1) Placing weight upon hands and feet, bend knees forward and raise trunk and legs upward as high as possible.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 6:**

**Starting position.** Lying face down with toes hooked over bottom rung and arms at sides.

**Movement.**

- (1) Lift head and trunk as far as possible from the floor. Place hands on buttocks.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 7:**

**Starting position.** Lying face down with toes hooked over bottom rung and arms folded behind the back.

**Movement.**

- (1) Raise head and trunk.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



**EXERCISE 8:**

**Starting position.** Lying face down with toes hooked over bottom rung and arms extended forward.

**Movement.**

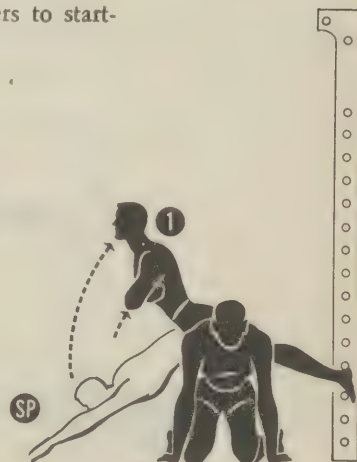
- (1) Raise head, trunk, and arms as high as possible.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

**EXERCISE 9:**

**Starting position.** One man assumes a kneeling position parallel to the stall bar. His partner lies across his back, extending arms forward and hooking toes in stall bar.

**Movement.**

- (1) Man on top raises head and trunk upward, arching back. Arms folded.
- (2) Man on top recovers to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).



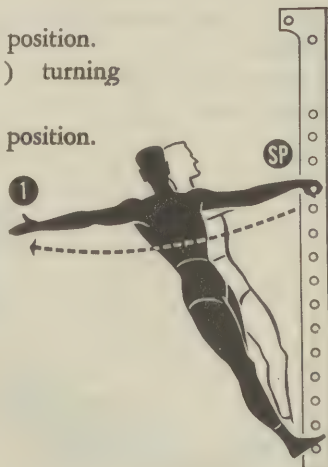
## g. General exercises for trunk.

## EXERCISE 1:

**Starting position.** Standing on bottom rung, grasping rung at height of chest, and leaning backward to full length of arms.

**Movement.**

- (1) Turn trunk to right swinging right arm to the right and rear as far as possible.
- (2) Recover to starting position.
- (3) Repeat count (1) turning trunk to left.
- (4) Recover to starting position.



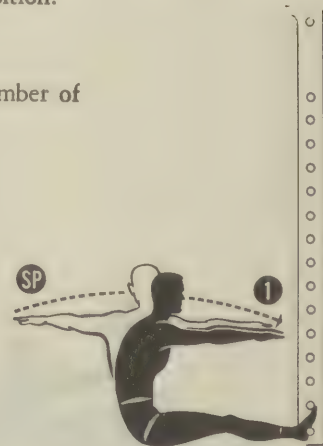
## EXERCISE 2:

**Starting position.** Sitting toward stall bar with trunk turned as far left as possible. Arms are extended sideward, toes are hooked under a lower rung.

**Movement.**

- (1) Turn trunk to front, facing stall bar. Bring arms together immediately in front of chest.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Repeat count (2).

Execute half the total number of repetitions on each side.



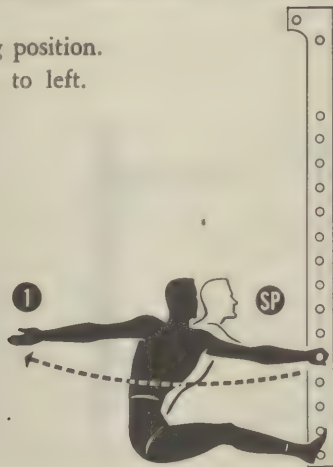


**EXERCISE 3:**

**Starting position.** Facing stall bar in sitting position, grasping rung in front of shoulders. Toes are hooked under one of the lower rungs.

**Movement.**

- (1) Turn trunk to right, swinging right arm to the right and backward. Retain grasp on stall bar with left hand.
- (2) Recover to starting position.
- (3) Repeat count (1) to left.
- (4) Repeat count (2).

**EXERCISE 4:**

**Starting position.** Lying on floor with toes hooked under bottom rung, arms extended forward.

**Movement.**

- (1) Turn trunk to right, swinging arms to floor on right side opposite right shoulder.
- (2) Recover to starting position.
- (3) Repeat count (1) to left side.
- (4) Recover to starting position.



## Section VII. PULLEY WEIGHT EXERCISES

**110. USE OF PULLEY WEIGHT EXERCISES.** Pulley weights provide a means of exercising specific groups of muscles. The exercise may be adjusted to the need by adding to or subtracting from the weight used. Exercises are prescribed according to the disability. Pulley weights will

be used largely for patients with healed injuries, or with specific weaknesses of muscle groups. This type of exercise may be used for Classes 3, 2, and 1, but will be used principally by patients in Classes 3 and 2.

**111. PULLEY WEIGHT EXERCISES.** The following exercises are arranged according to the parts of the body exercised, and in approximate order of severity:

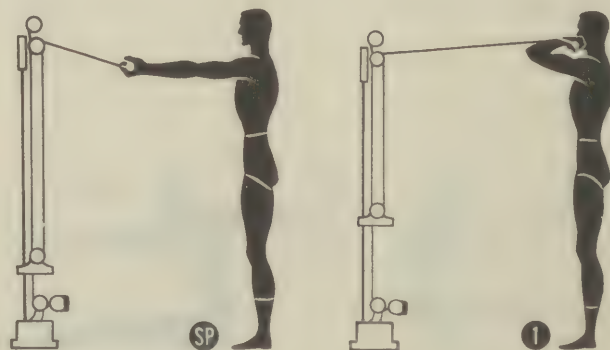
### a. Exercises primarily for upper arms.

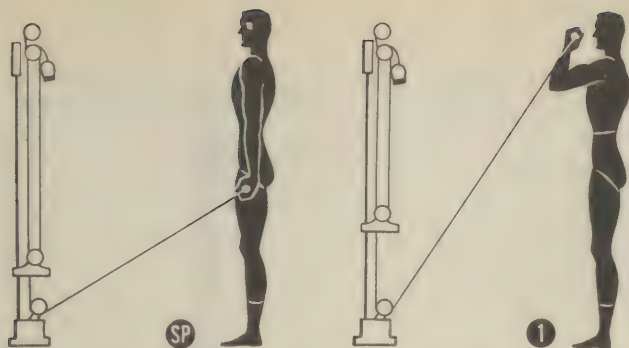
#### EXERCISE 1:

**Starting position.** Facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys with palms up.

#### Movement.

- (1) Pull weights to shoulders by flexing elbows.
- (2) Extend elbows to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.





### EXERCISE 2:

**Starting position.** Facing apparatus. Arms hang at sides. Hands grasp lower pulleys with the palms forward.

**Movement.**

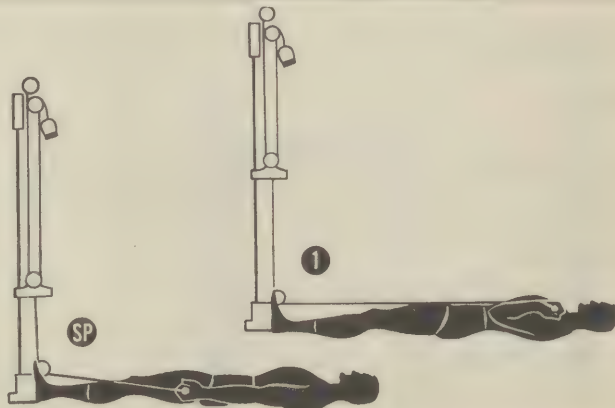
- (1) Pull handles to shoulders by swinging arms forward to horizontal position and flexing elbows.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

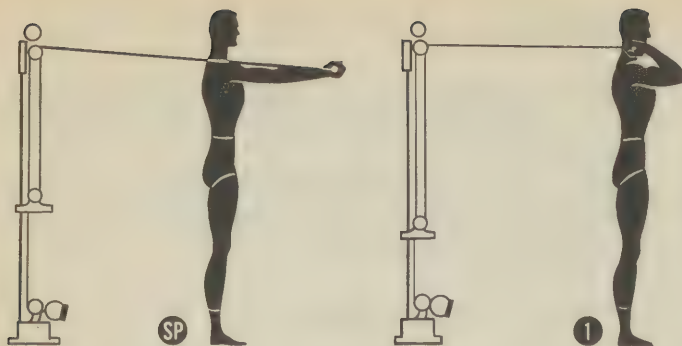
### EXERCISE 3:

**Starting position.** Lying on back with heels touching apparatus. Arms are at sides. Hands hold lower pulleys with palms up.

**Movement.**

- (1) Pull handles to shoulders by flexing elbows.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



**EXERCISE 4:**

**Starting position.** Back to apparatus, arms extended forward at shoulder height, hands holding upper pulleys. Pulley rope extends over the shoulders.

**Movement.**

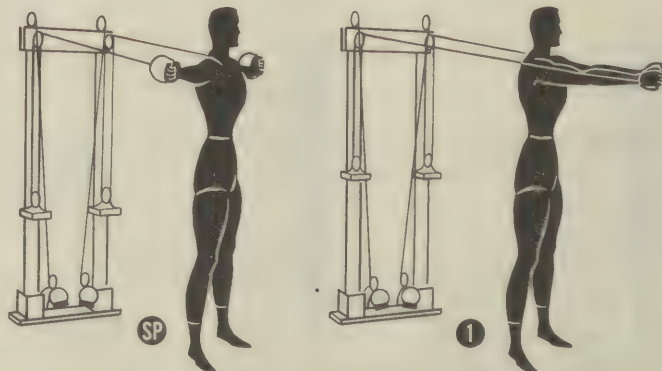
- (1) Flex the elbows on the upper arms.
- (2) Extend the elbows.
- (3) Repeat count (1).
- (4) Repeat count (2).

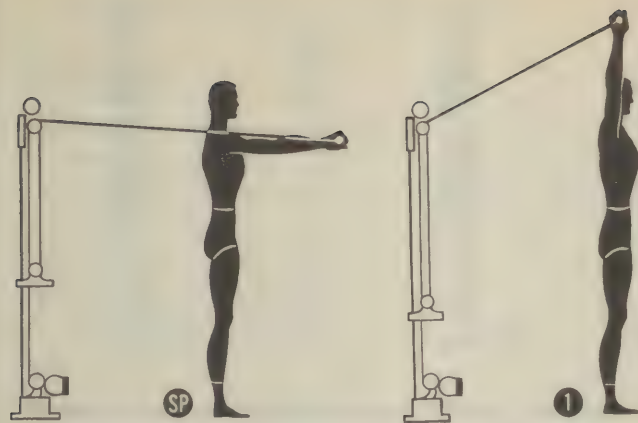
**b. Exercises primarily for chest and front of shoulders.****EXERCISE 1:**

**Starting position.** Standing erect, feet apart, with back to apparatus. Arms are extended to the sides at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Swing arms forward shoulder height.
- (2) Return arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.





## EXERCISE 2:

**Starting position.** Standing erect, feet together, with back to apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

### Movement.

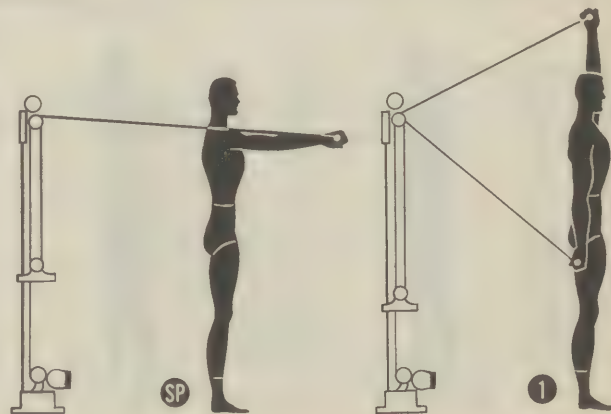
- (1) Raise arms overhead.
- (2) Pull arms forward to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

## EXERCISE 3:

**Starting position.** Standing erect, feet together, with back to apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

### Movement.

- (1) Swing left arm overhead and lower right arm to side.
- (2) Recover to starting position.
- (3) Swing right arm overhead and lower left arm to side.
- (4) Recover to starting position.



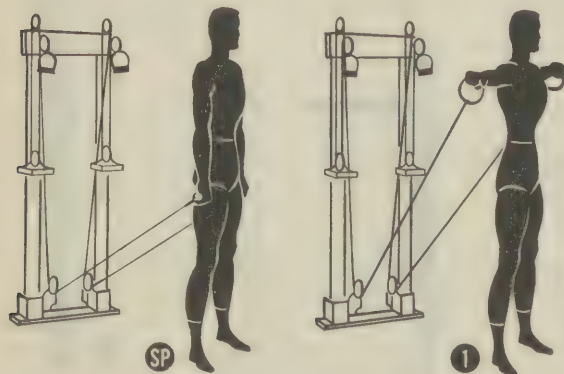
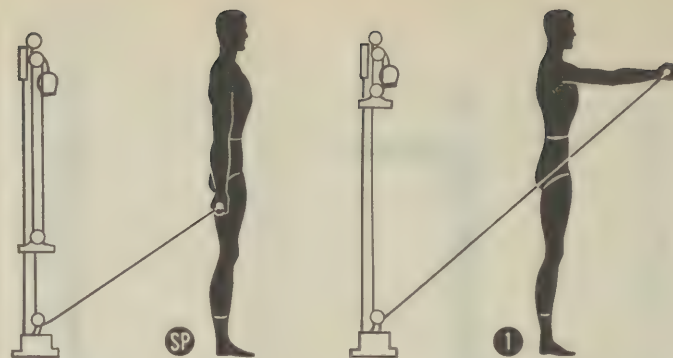


# EXERCISE 4:

**Starting position.** Standing erect, feet together, with back to apparatus. Arms are hanging at the sides. Hands hold lower pulleys.

## Movement.

- (1) Raise arms forward to height of shoulders.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



# EXERCISE 5:

**Starting position.** Standing erect, feet apart, with back to apparatus. Arms are hanging at the sides. Hands hold lower pulleys.

## Movement.

- (1) Raise arms to sides, shoulder height.
- (2) Lower arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

c. Exercises primarily for shoulders.

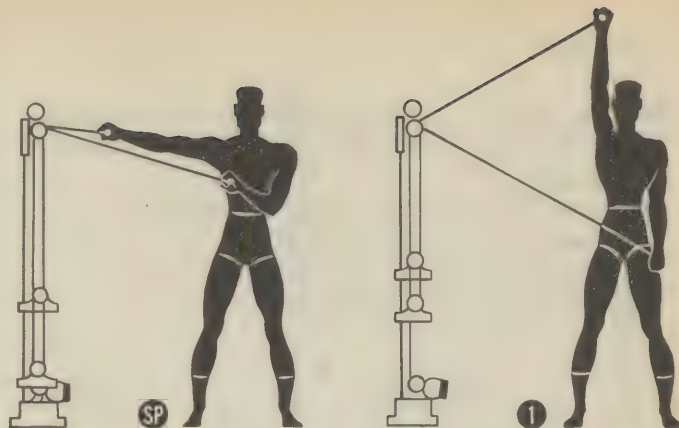
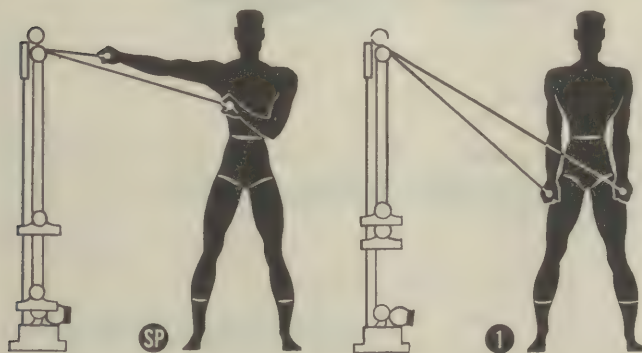
**EXERCISE 1:**

**Starting position.** Standing erect, feet apart, with right side toward apparatus. Right arm is extended to the right and the left arm is bent in front of the chest. Hands hold upper pulleys.

**Movement.**

- (1) Pull arms to the sides of the body.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

Execute half the number of repetitions on each side.



**EXERCISE 2:**

**Starting position.** Standing erect, feet apart, with right side toward apparatus. Right arm is extended to the right and the left arm is bent in front of the chest. Hands hold upper pulleys.

**Movement.**

- (1) Pull right arm overhead and left arm to left side.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

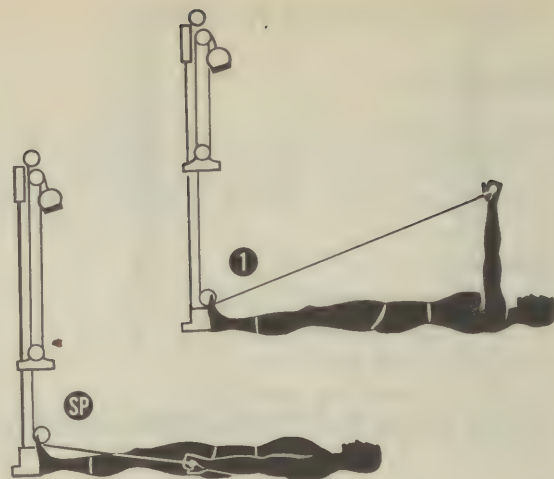
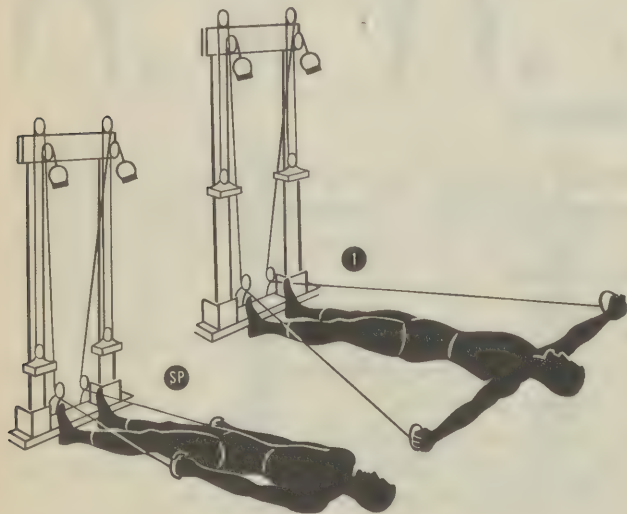
Execute half the repetitions with the right side to apparatus and half with the left side to apparatus.

**EXERCISE 3:**

**Starting position.** Lie on back with feet toward apparatus. Arms are parallel to sides. Hands hold lower pulleys.

**Movement.**

- (1) Swing arms sideward, on line with shoulders.
- (2) Return arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 4:**

**Starting position.** Lie on back with feet toward apparatus. Arms are parallel to sides. Hands hold lower pulleys.

**Movement.**

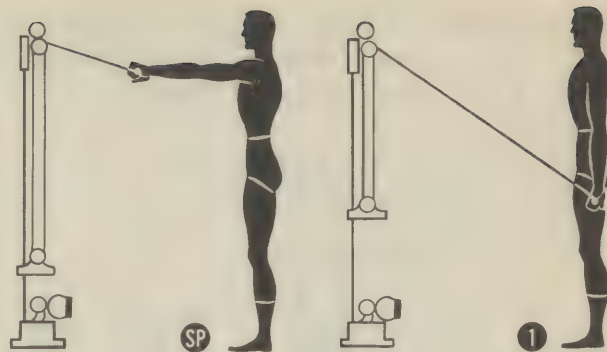
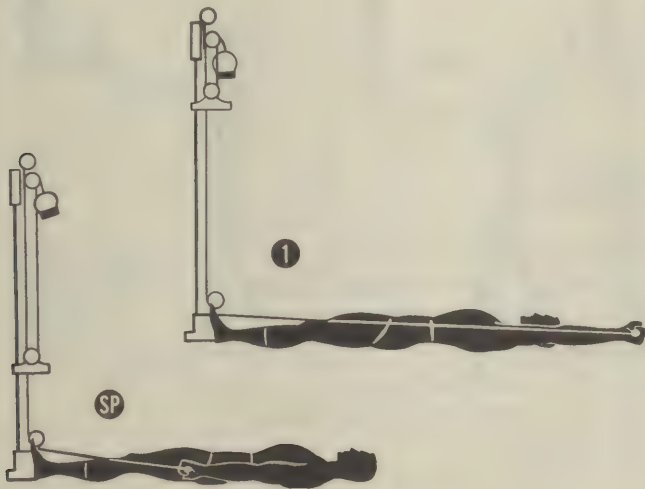
- (1) Raise arms forward, that is, perpendicular to body.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 5:**

**Starting position.** Lie on back with feet toward apparatus. Arms are parallel to sides. Hands hold lower pulleys.

**Movement.**

- (1) Swing arms forward overhead.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 6:**

**Starting position.** Standing erect, feet together, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

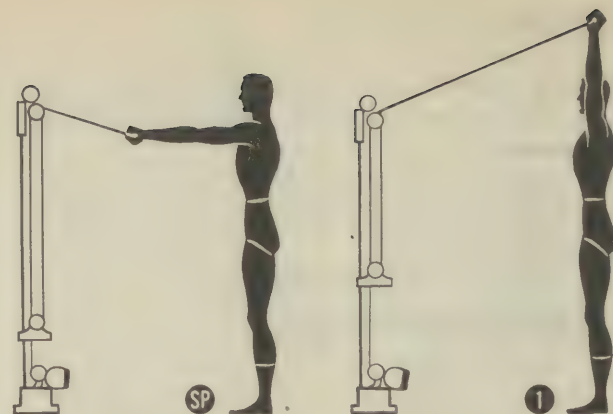
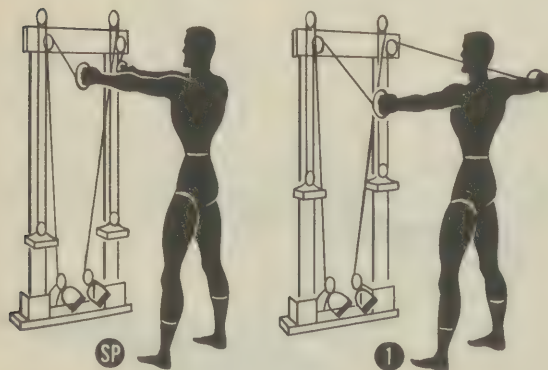
- (1) Lower arms to sides of body.
- (2) Raise arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 7:**

**Starting position.** Standing erect, feet shoulder-width apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Swing arms sideward, shoulder height.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 8:**

**Starting position.** Standing erect, feet together, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Raise arms overhead.
- (2) Lower arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

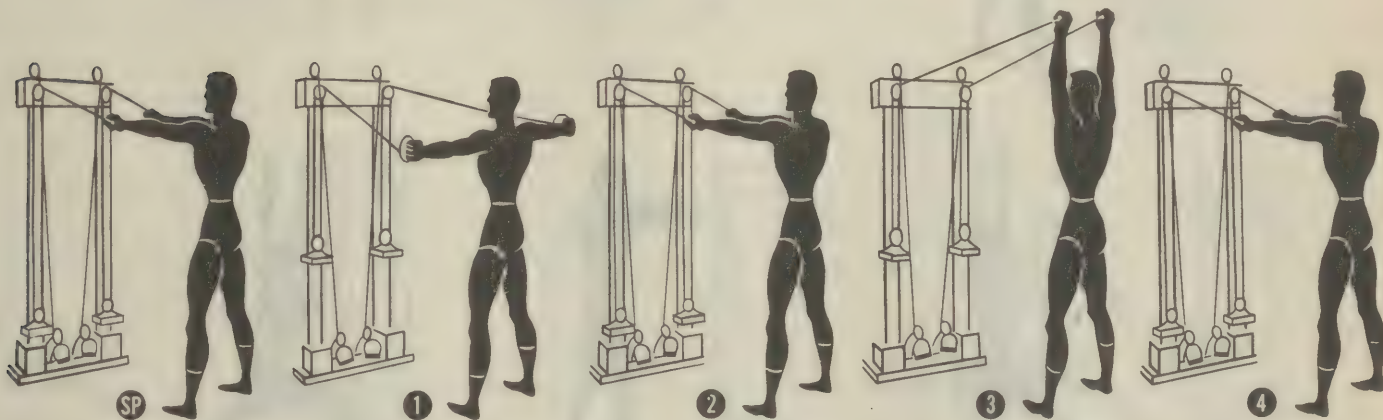


**EXERCISE 9:**

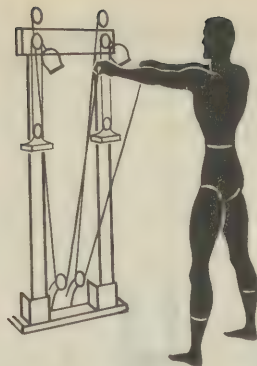
**Starting position.** Standing erect, feet shoulder-width apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Swing arms to the sides, shoulder height.
- (2) Return arms to starting position.
- (3) Raise arms overhead.
- (4) Recover to starting position.



Starting  
Position

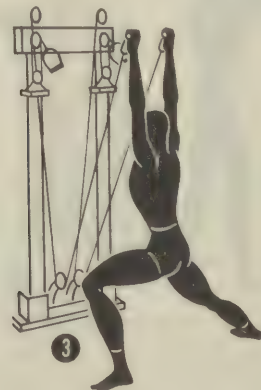
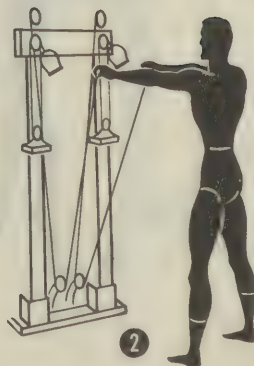
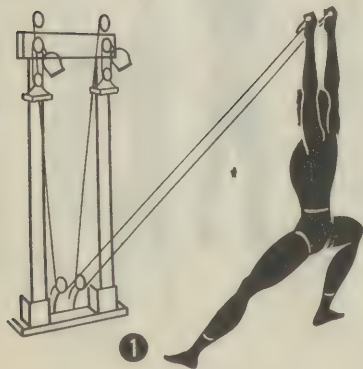


# EXERCISE 10:

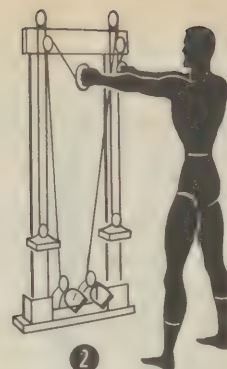
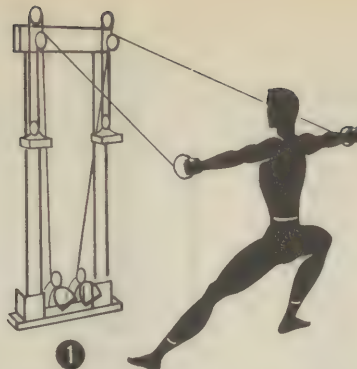
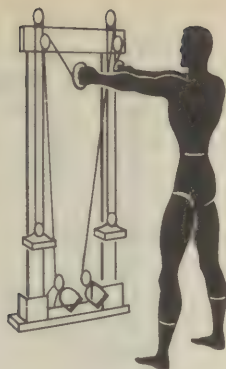
**Starting position.** Standing erect, feet shoulder-width apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold lower pulley.

## Movement.

- (1) Lunge to right and raise arms overhead.
- (2) Recover to starting position.
- (3) Lunge to left and raise arms overhead.
- (4) Recover to starting position.



Starting  
Position

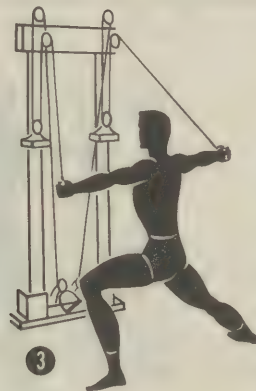


## EXERCISE 11:

**Starting position.** Standing erect, feet shoulder-width apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulley.

### Movement.

- (1) Lunge to right and swing arms to sides, shoulder height.
- (2) Recover to starting position.
- (3) Lunge to left and swing arms to sides, shoulder height.
- (4) Recover to starting position.

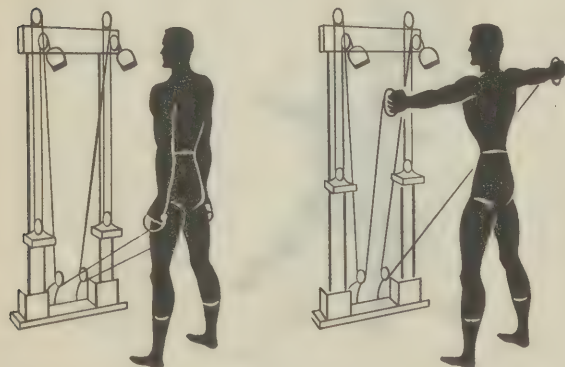
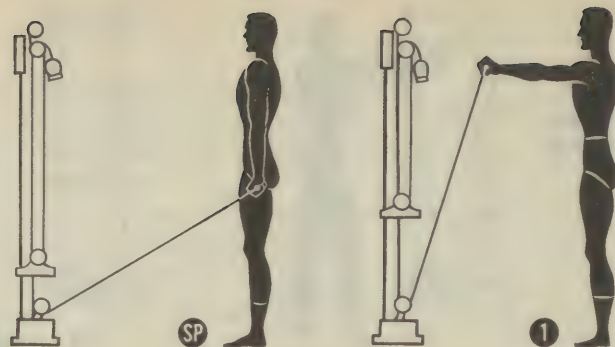


# EXERCISE 12:

**Starting position.** Standing erect, feet together, facing apparatus. Arms are hanging at sides. Hands hold lower pulleys.

## Movement.

- (1) Raise arms forward, shoulder height.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



# EXERCISE 13:

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are hanging at sides. Hands hold lower pulleys.

## Movement.

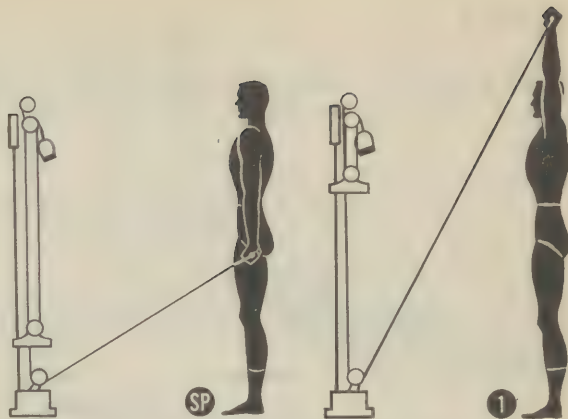
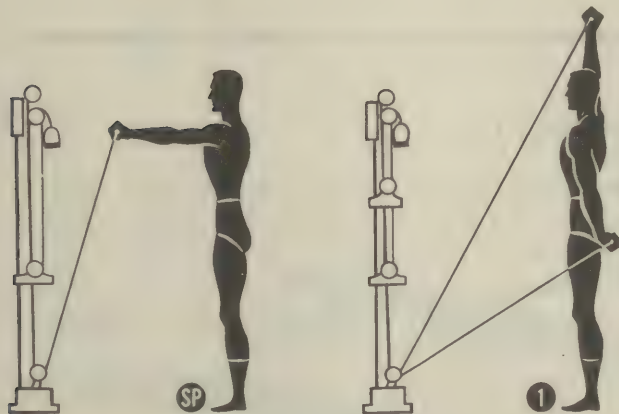
- (1) Raise arms to side, shoulder level.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 14:**

**Starting position.** Standing erect, feet together, facing apparatus. Arms are extended forward at shoulder height. Hands hold lower pulleys.

**Movement.**

- (1) Raise right arm overhead and lower left arm to side.
- (2) Recover to starting position.
- (3) Raise left arm overhead and lower right arm to side.
- (4) Recover to starting position.

**EXERCISE 15:**

**Starting position.** Standing erect, feet together, facing apparatus. Arms are hanging at sides. Hands hold pulleys.

**Movement.**

- (1) Raise arms forward overhead.
- (2) Lower arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

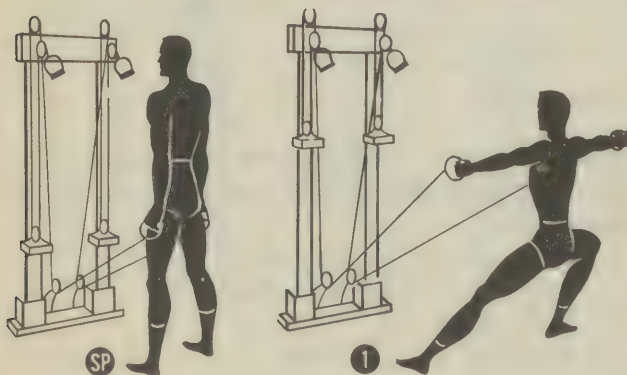
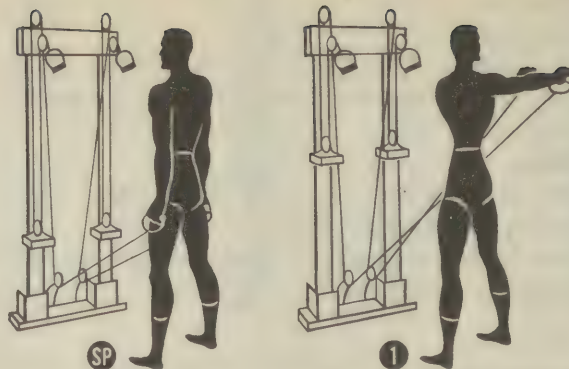


**EXERCISE 16:**

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are hanging at sides. Hands hold lower pulleys.

**Movement.**

- (1) Turn trunk to right and raise arms forward shoulder height.
- (2) Recover to starting position.
- (3) Turn trunk to left and raise arms forward, shoulder height.
- (4) Recover to starting position.

**EXERCISE 17:**

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are hanging at sides. Hands hold lower pulleys.

**Movement.**

- (1) Lunge to right and raise arms to sides, shoulder height.
- (2) Recover to starting position.
- (3) Lunge to left and raise arms to sides, shoulder height.
- (4) Recover to starting position.

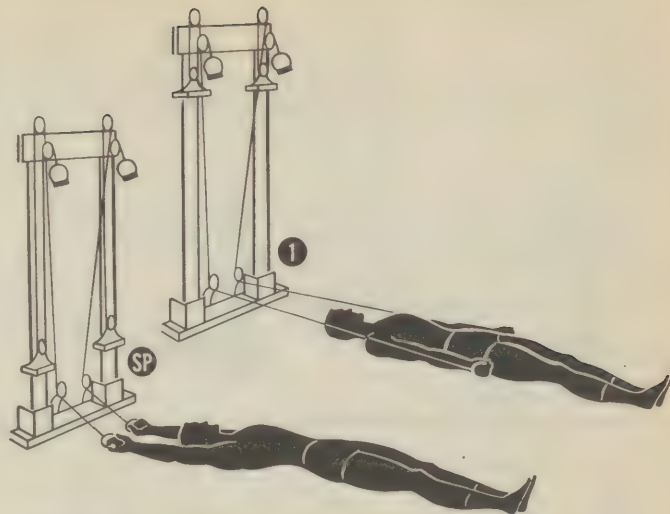
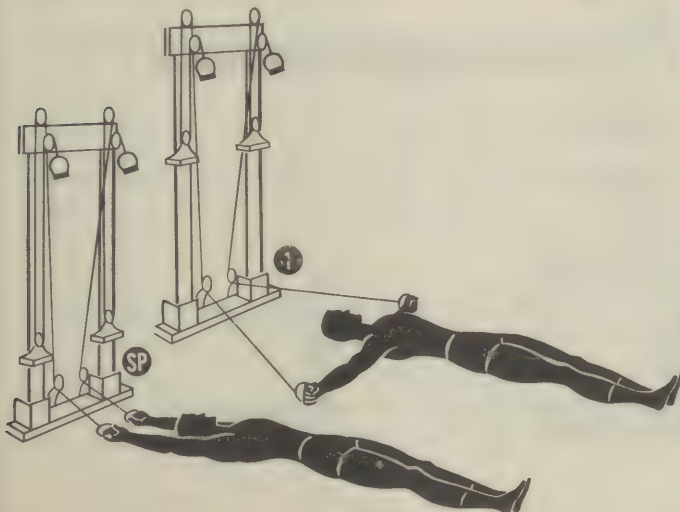
#### d. Exercises for muscles of chest and upper back.

##### EXERCISE 1:

**Starting position.** Lying on back with head toward apparatus. Arms are extended overhead. Hands hold lower pulleys.

**Movement.**

- (1) Pull arms to side on line with shoulders.
- (2) Return arms to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



##### EXERCISE 2:

**Starting position.** Lying on back with head toward apparatus. Arms are extended overhead. Hands hold lower pulleys.

**Movement.**

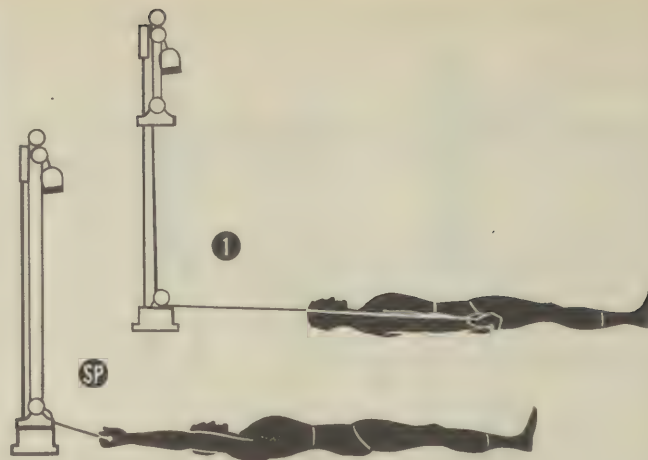
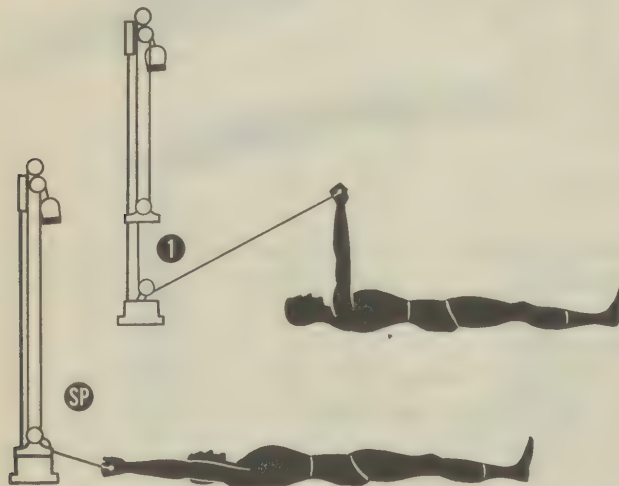
- (1) Pull arms sideward and downward to sides.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 3:**

**Starting position.** Lying on back with head toward apparatus. Arms are extended overhead. Hands hold lower pulleys.

**Movement.**

- (1) Pull arms forward, that is, perpendicular to chest.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

**EXERCISE 4:**

**Starting position.** Lying on back with head toward apparatus. Arms are extended overhead. Hands hold lower pulleys.

**Movement.**

- (1) Pull arms forward downward to position along sides of the body.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

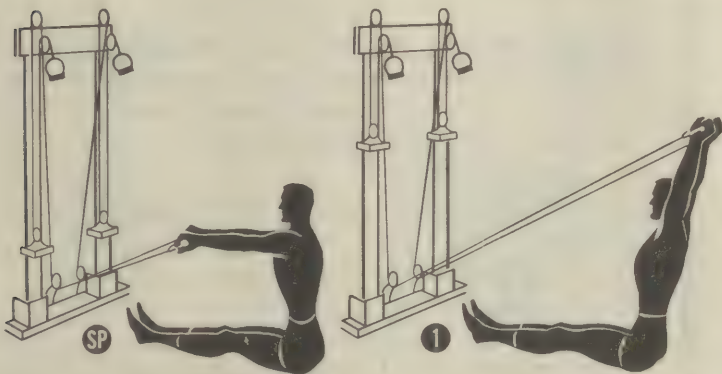
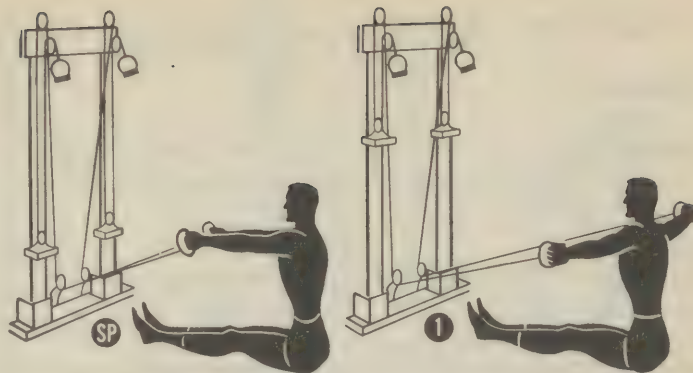
### e. Exercises for muscles retracting shoulders.

#### EXERCISE 1:

**Starting position.** Facing apparatus in a sitting position. Feet are together. Arms are extended forward at shoulder height. Hands hold lower pulleys.

**Movement.**

- (1) Swing arms horizontally to side.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



#### EXERCISE 2:

**Starting position.** Facing the apparatus in a sitting position. Feet are together. Arms are extended forward at shoulder height. Hands hold lower pulleys.

**Movement.**

- (1) Pull arms overhead.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

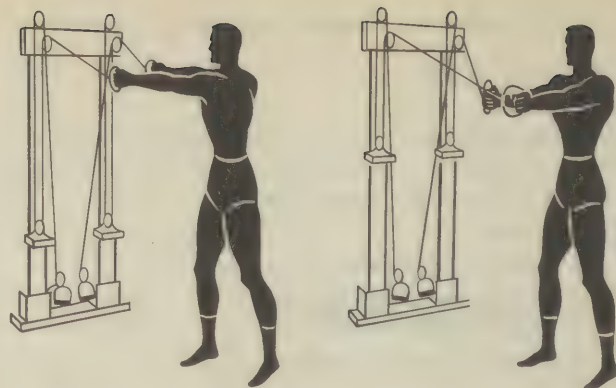
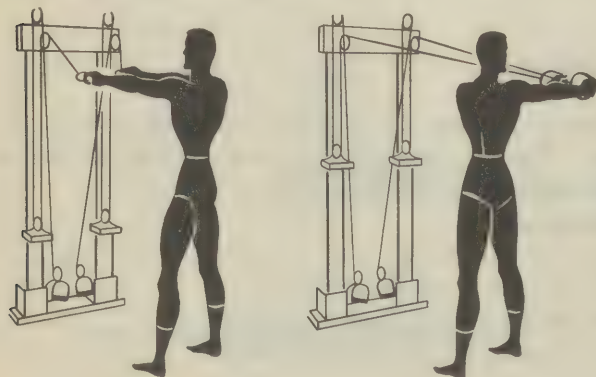
## f. Exercises for abdominal and waist muscles generally.

### EXERCISE 1:

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Turn trunk to right, pulling arms to the right by this movement.
- (2) Recover to starting position.
- (3) Turn trunk to left, pulling arms to the left by this movement.
- (4) Recover to starting position.



### EXERCISE 2:

**Starting position.** Standing erect, feet apart, with all of the right side toward the apparatus, except the trunk which is facing the pulleys. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Turn trunk to left, pulling arms to the left by this movement.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

Execute half the total repetitions on each side.

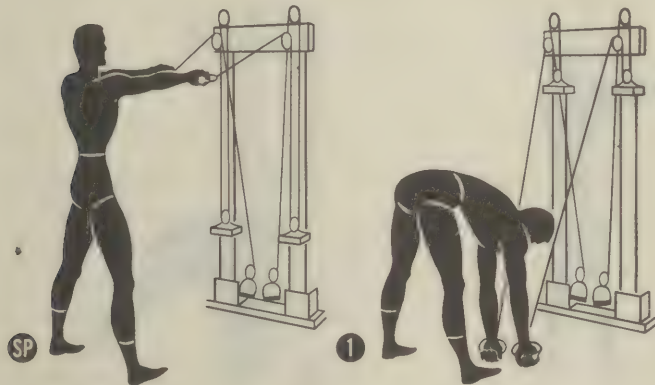
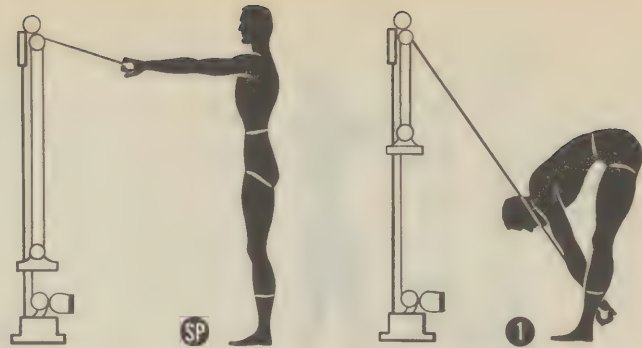


### EXERCISE 3:

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Bend trunk forward swinging arms backward between legs. Keep knees straight.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

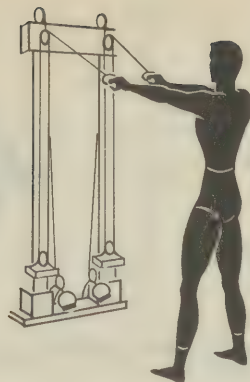


### EXERCISE 4:

**Starting position.** Standing erect, feet apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

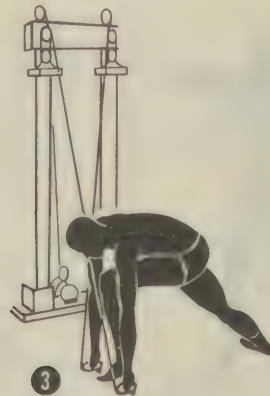
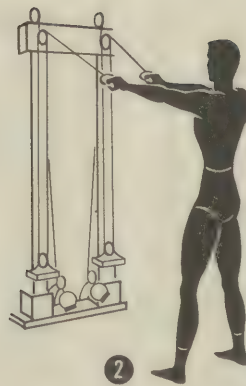
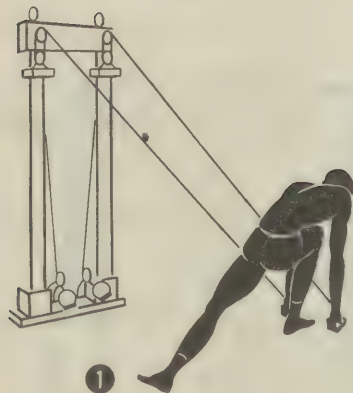
- (1) Bend trunk forward and swing both hands to right toe. Keep knees straight.
- (2) Recover to starting position.
- (3) Bend trunk forward and swing both hands to left toe. Keep knees straight.
- (4) Recover to starting position.

Starting  
Position**EXERCISE 5:**

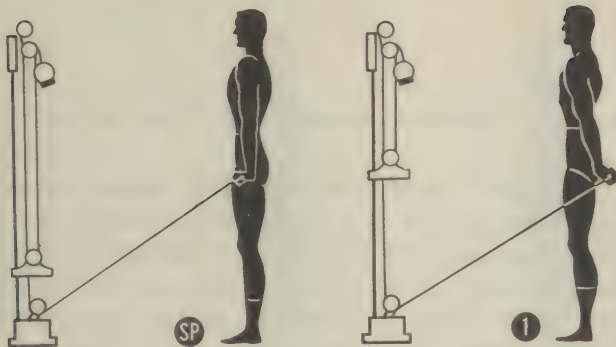
**Starting position.** Standing erect, feet apart, facing apparatus. Arms are extended forward at shoulder height. Hands hold upper pulleys.

**Movement.**

- (1) Stepping to right with right foot, turn and bend trunk forward. Stretch arms forward and touch hands to floor in front of right foot.
- (2) Recover to starting position.
- (3) Repeat count (1) to left.
- (4) Recover to starting position.



### g. Exercises for hands and feet.



#### EXERCISE 1:

**Starting position.** Standing erect, feet together, facing apparatus. Arms are hanging at sides. Hands hold lower pulleys, palms down.

**Movement.**

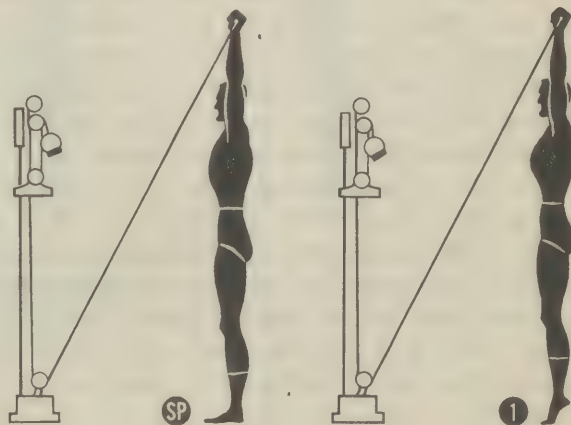
- (1) Flex wrists backward.
- (2) Recover to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.

#### EXERCISE 2:

**Starting position.** Standing erect, feet together, facing apparatus. Arms are raised overhead. Hands hold lower pulleys.

**Movement.**

- (1) Raise heels as high as possible.
- (2) Lower heels to starting position.
- (3) Repeat count (1).
- (4) Recover to starting position.



## CHAPTER 8

### POSTURE TRAINING

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#### Section I. GENERAL

**112. CONCEPT OF GOOD POSTURE.** There is no one "best posture" for all men because the physical architecture of individuals differs according to the bony structure they inherit. Nevertheless, there are certain general principles which if intelligently applied to a group as a whole, or to its individual members, will develop good posture. These principles are to teach men what the elements of good posture are, to enable them to "feel" or practice good posture, and then to motivate them to acquire it as a habit. (See par. 114.) Frequently a man *feels* more natural while maintaining bad posture. Many men do not even know what constitutes bad posture and what constitutes good. In the mistaken belief of assuming good posture, they may arch the lower back and thrust out the chest unduly, or perhaps spring their knees backward and throw out their feet to an angle of 45°.

**113. TEACHING GOOD POSTURE.** First train the patient to carry weights of from 10 to 30 pounds on his head. Show him that as he pushes this weight upward, slightly tightening his abdominal muscles and pulling his shoulders back instead of holding them forward, he assumes good posture. Then teach him to assume this posture without using the weight, by noticing how it "feels" to stand in this position. If possible let him see himself in a large mirror.

**114. MOTIVATING GOOD POSTURE.** Regardless of the amount of exercise and instruction they get, men habitually assume good posture only if they *want* to. That is why motivation is so important.

a. At the beginning, give a short talk, illustrated if possible, on reasons for cultivating good posture: Good posture has many values for the convalescent. First, a soldier is often judged by his appearance—the man with good posture looks

## GOOD



1. Head, trunk, and thigh in straight line.
2. Chest high and forward.
3. Abdomen flat.
4. Back curves normal.

## FAIR



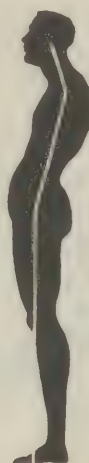
1. Head forward.
2. Abdomen prominent.
3. Exaggerated curve in upper back.
4. Slight hollow back.

## POOR



1. Relaxed (fatigue) posture.
2. Head forward.
3. Abdomen relaxed.
4. Shoulder blades prominent.
5. Hollow back.

## VERY POOR



1. Head forward badly.
2. Very exaggerated curve upper back.
3. Abdomen relaxed.
4. Chest flat—sloping.
5. Hollow back.



like a soldier, he commands attention. Good posture has an economic value for men to be discharged from the Army—a man who habitually stands well and walks with a spring in his step makes a better impression. Secondly, it is an accepted psychological fact that good posture is associated with good morale—a man with a good posture feels better and is more positive. A man with poor posture cannot feel as well, consequently he may develop a negative and discouraged attitude.

**b.** Demonstrate good posture and methods of attaining it. When possible use visual aids. Post a few signs at familiar places to remind patients to emphasize good posture. Instructors should at all times be excellent examples of good posture. They must be enthusiastic about good posture to "sell it" to the men. Compliment patients with excellent posture. Remind them, without nagging, when they exhibit poor posture.

**c.** Posture judgments once a week motivate good posture. The four posture silhouettes shown are highly valid standards

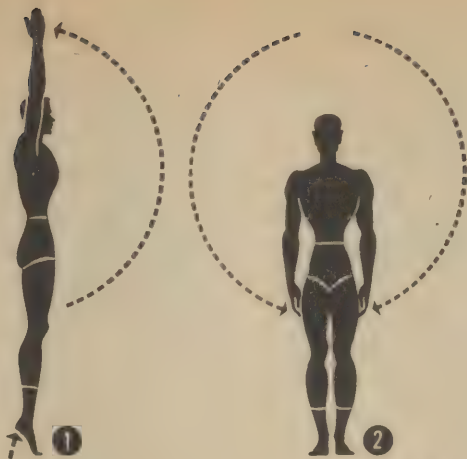
to judge by. Using them, it only takes a few minutes to judge 100 men, especially if the inspection is of small groups during the rotation program in the gymnasium. Also judge the men occasionally when off guard. Announcing the platoon with the best average posture may stimulate friendly rivalry.

## Section II. POSTURAL EXERCISES

**115. GENERAL.** **a.** Certain muscle groups must have special training to maintain good posture without undue fatigue. The exercises below will give this training. Many of these exercises should be included with the conditioning drills, especially for Classes 3 and 2.

**b.** All of these exercises have slow cadence and two-count movements.

Starting Position



## EXERCISE 1:

**Starting position.** Attention.

**Movement.**

- (1) Swing arms forward and upward to full stretch overhead and at the same time rise high on toes.
- (2) Swing arms sideward and downward, and press back hard. At the same time retract chin and let heels drop to the ground. Avoid an exaggerated arch in lower back.

## EXERCISE 2:

**Starting position.** Trunk leaning forward about 60°, arms hanging downward loosely from shoulders.

**Movement.**

- (1) Swing arms sideward and backward vigorously, retracting chin forcefully and flattening upper back. Hold this position momentarily.
- (2) Recover to starting position.

Starting Position



**Starting Position**



**EXERCISE 3:**

**Starting position.** Lying face down on the floor with elbows at sides and fingertips on shoulders.

**Movement.**

- (1) Rotate arms outward and pull elbows in hard to sides. At the same time pull in chin and lift head about 6 inches from the floor. Hold this position a full second.
- (2) Recover to starting position.

**EXERCISE 4:**

**Starting position.** Kneeling on the mat with trunk bent slightly forward and hands behind head.

**Movement.**

- (1) Still leaning forward, straighten upper back and press elbows and head backward while pulling in chin.
- (2) Recover to starting position.

**Starting Position**



**Starting Position****EXERCISE 5:**

**Starting position.** Sitting on the floor with knees raised, trunk bent forward, and arms stretched forward.

**Movement.**

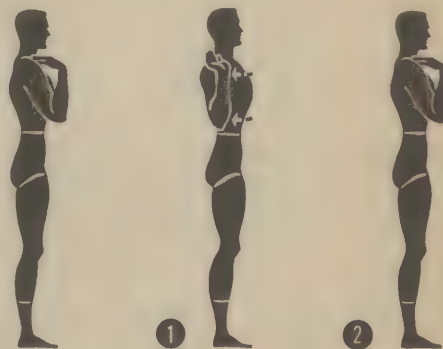
- (1) Still leaning forward, swing arms upward and backward, at the same time pulling in chin.
- (2) Recover to starting position.

**EXERCISE 6:**

**Starting position.** Standing with fingertips touching shoulders, arms in front of chest, and elbows downward.

**Movement.**

- (1) Move upper arms outward and backward, with elbows hugging sides. Hold the position a full second while trying to force arms farther around and back. At same time, retract head and attempt to stretch upward.
- (2) Recover to starting position.

**Starting Position**

Starting  
Position**EXERCISE 7:**

**Starting position.** Bending forward about  $45^\circ$  with elbows horizontally sideward from shoulders, forearms bent forward, palms down, and thumbs just in front of shoulders.

**Movement.**

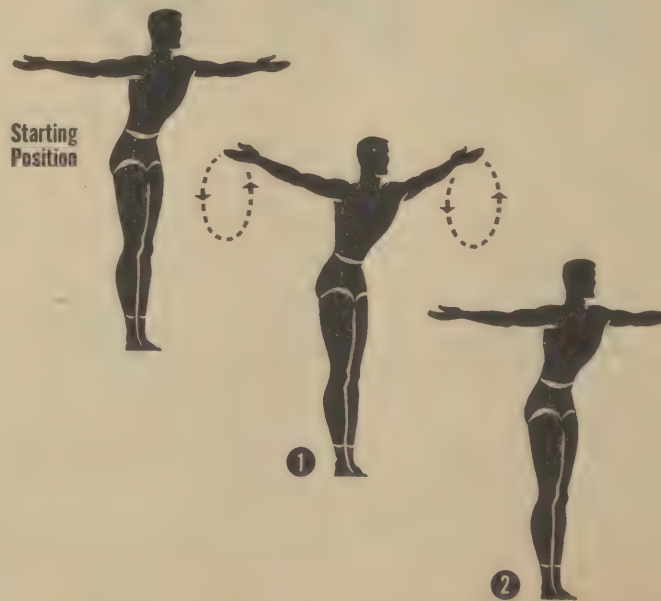
- (1) Straighten elbows and swing arms slowly but hard sideward and backward. At the same time retract head.
- (2) Recover to starting position.

**EXERCISE 8:**

**Starting position.** Leaning slightly forward with arms horizontally at sides and palms up.

**Movement.**

- (1) Make small circles about a foot in diameter with hands circling upward and backward. Press arms backward and retract head.
- (2) Recover to starting position.





**Starting  
Position**



**EXERCISE 9:**

**Starting position.** Leaning slightly forward with elbows bent and finger tips touching shoulders.

**Movement.**

- (1) Make small circles about 1 foot in diameter with elbows circling upward and backward. Press arms backward and retract head.
- (2) Recover to starting position.

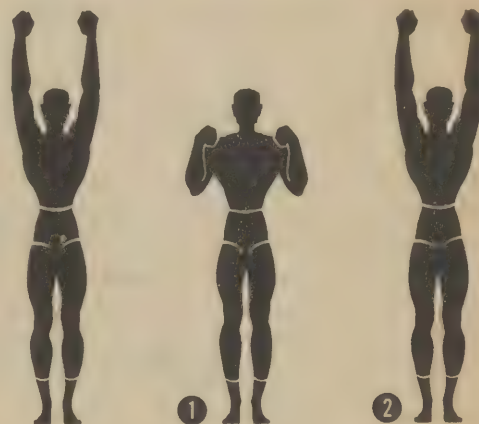
**EXERCISE 10:**

**Starting position.** Arms overhead.

**Movement.**

- (1) Pull arms slowly downward until fists are beside shoulders, pulling as though chinning.
- (2) Recover to starting position.

**Starting  
Position**



## CHAPTER 9

REMEDIAL EXERCISES: WITH AND WITHOUT  
APPARATUS

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**116. CONDUCT OF REMEDIAL EXERCISES.** a. The exercises in this chapter are used to strengthen weakened muscles and increase range of motion. They supplement similar exercises administered by the Physical Therapy Department. Because of their individual nature, the exercises will be prescribed by the ward officer and will not be undertaken except at his direction. He prescribes when the patient is ready to begin, how many repetitions may be performed at a given time, and how frequently the exercises may be administered. The exercises below range in severity from mild ones, which may be done soon after an operation, to those of such intensity that they should not be prescribed until the injury is completely

healed. The medical officer's prescription should be followed.

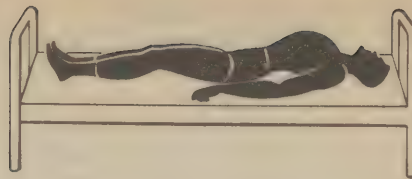
b. The instructor should direct the patient not to exercise beyond the point of pain. In general, after the patient has recovered sufficiently to begin the exercises, it will benefit him to exercise once every hour that he is awake. The number of repetitions should gradually increase as the affected part becomes stronger. The instructor should make every effort to get the patient's cooperation, for only when the patient enters wholeheartedly into the exercise will he gain the maximum benefit from it.

**117. EXERCISES FOR CONVALESCENT BACK INJURY.**

## a. Exercises without apparatus.

### EXERCISE 1:

Lie on back in bed. Hyperextend the back as in an ordinary stretch. Move back of head and chin backward. Press back of head and buttocks hard on the bed. Try to lift the middle of the back.



### EXERCISE 2:

Lie on back with hands behind head. Raise back from the bed and rest on forearms, elbows, head, and buttocks.

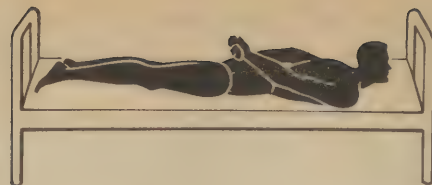
### EXERCISE 3:

Lie on back with hands clasped behind head, knees raised, and feet about 2 feet apart. "Bridge" up from the bed and rest on head, hands, forearms, and feet. Hyperextend spine and raise hips about 1½ feet from the bed.



# **EXERCISE 4:**

Lie face down in bed or on floor. Clasp hands behind hips. Raise head upward from the bed.



# **EXERCISE 5:**

Lie face down in bed or on floor. Clasp hands behind hips. Raise head and shoulders and arch back.

# **EXERCISE 6:**

Lie face down in bed or on floor. Clasp hands behind hips. Raise legs backward alternately, first one leg and then the other.



# EXERCISE 7:

Lie face down in bed or on floor. Hold edge of mat or bed. Raise both legs at the same time.



# EXERCISE 8:

Lie on back with knees drawn up, feet about 2 feet apart, fists pressed on pillow on either side of head, elbows elevated, and forearms alongside of head. Raise trunk from bed and rest weight solely on head, fists, and knees. Raise hips until body is about straight from shoulders to knees.



# EXERCISE 9:

Lie face down across the bed with head and chest hanging over the edge, hands clasped behind head. Legs are held down against the bed by another person. Raise trunk slightly above the horizontal.

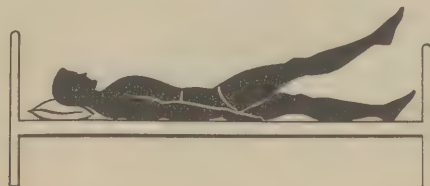




*The following exercises are for the abdomen, as well as the back.*

# EXERCISE 10:

Lie on back and raise knees. Pull in abdomen as far as possible and at the same time raise the chest. Hold this movement for about 3 seconds, then relax for about 1 second. Exhale while pulling in abdomen.



# EXERCISE 11:

Lie on back. Raise first one leg, then the other, keeping knees and back straight. Hold legs about 1½ feet off bed for 2 or 3 seconds.

# EXERCISE 12:

Lie on back. Raise both legs at the same time, keeping knees and back straight. Hold legs about 1½ feet off bed for 2 or 3 seconds.

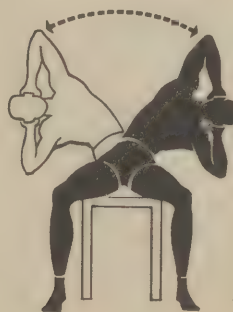


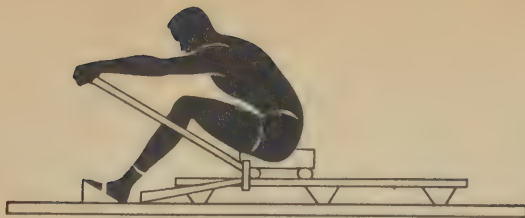
**EXERCISE 13:**

Lie on back. Feet are about 2 feet apart and held by partner. Arms are parallel to sides. Raise trunk, keeping back straight, until reaching the erect sitting position. Then return to a reclining position, slowly lowering trunk. The hands do not assist in this exercise.

**EXERCISE 14:**

Sit erect on chair with feet apart and hands behind head. Bend from side to side. Pull elbows back and keep back arched. This exercise may also be performed with a pause in the erect position between alternate bends.





### b. Exercises with apparatus.

#### EXERCISE 15: ROWING MACHINES.

Two types of rowing machine devices may be used in the treatment program:

The first is the usual commercial hydraulic rowing machine in which the oars meet a hydraulic resistance during the pull, but not during the recovery. The machine has a sliding seat, so that the exercise is useful for the legs as well as for the back and the arms. When the trainee swings forward on the recovery, he contracts the abdominal muscles. At the beginning of the movement he is leaning forward, with knees bent and arms extended forward. He extends first the legs, and then the back. The final movement is a pull through of the hands. On the recovery the arms and the trunk move simultaneously. The resistance in the oars can be varied to meet



the needs of the individual.

Another type of rowing device consists of two wooden bars about  $2\frac{1}{2}$  or 3 feet long, connected at the ends with ropes from 1 to  $2\frac{1}{2}$  feet long (the better the condition of the trainee, the shorter the ropes). Two trainees sit on the floor, facing each other, the soles of their feet in opposition. Each trainee grasps one of the bars. One man pulls more forcibly than the other, pulling him forward against resistance. The other man then pulls more forcibly and the movement is reversed. In this rowing device, only the back and legs are exercised, for in the forward movement, the man is being pulled forward.

**118. EXERCISES FOR SHOULDER.** The shoulder exercises below may be supplemented by pulley weight exercises and by movements with the spring exercisers. The pulley weights may be used relatively early in the program if the weights are light. The work with the spring exerciser should come later.

## a. Exercises without apparatus.

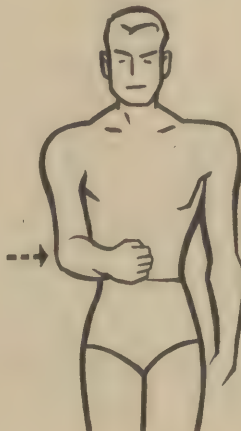


### EXERCISE 1:

Stand with trunk bent forward about  $80^\circ$  and arms hanging loosely downward towards the floor. Swing arms passively backward and forward in a small conelike movement by utilizing the momentum of the body. The arms swing or circle passively without the shoulder muscles being particularly concerned in the movement. This exercise will first emphasize the forward and backward movements, and later the sideward and circular movement or circumduction.

### EXERCISE 2:

This exercise may be done while lying, sitting, or standing. Flex elbow to a right or more acute angle and hold it against the side of the chest. Raise shoulders slightly. Press elbow hard against the side of the chest. This will exercise the pectoralis major, the latissimus dorsi, and teres major.



### EXERCISE 3:

This exercise may be done while lying, sitting, or standing. Flex elbow of affected side to about a right angle and place fist within the palm of the other hand. Press arm across in front of the chest, resisting the movement mildly with the other hand. This resistance may be increased as the shoulder muscles strengthen.

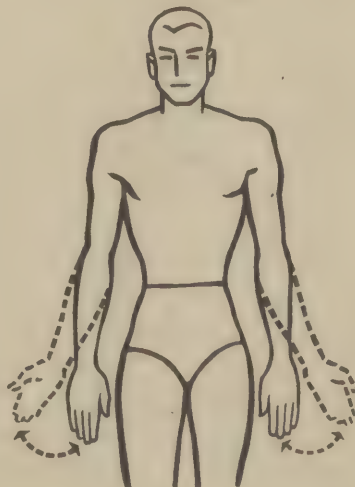


#### EXERCISE 4:

This exercise may be done while lying, sitting; or standing. Flex elbow of affected shoulder to a right angle and rest forearm across the front of the chest. Hold wrist with the other hand. With the shoulder slightly raised, try to pull the elbow away from the body. Since the wrist is held firmly by the opposite hand, there is movement of not more than 4 to 6 inches. The movement is purely abduction, not outward rotation.

#### EXERCISE 5:

Lie or stand with arms parallel to body. Rotate the arms outward, then rotate them inward. Increase the range of rotation from day to day.



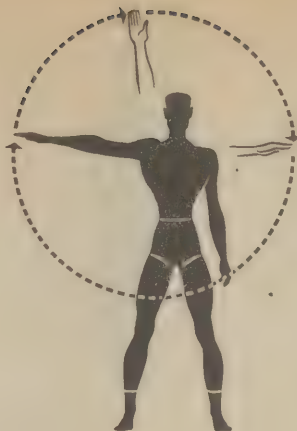
#### EXERCISE 6:

Stand with arms down. Raise arms forward and upward, then forward, downward, and backward. Continue movement over as large range as can be traversed without pain.



## EXERCISE 7:

This exercise can be done either sitting or standing. Raise arms sideward to horizontal position.



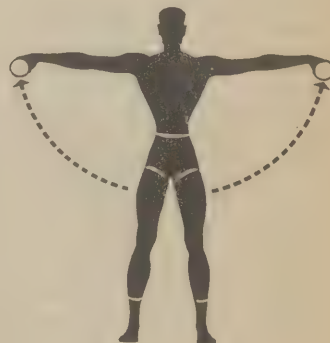
## EXERCISE 8:

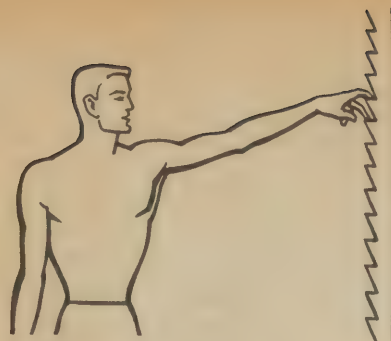
Stand erect and circumduct the arm across and in front of the body, upward and outward to the outside. The hand circumscribes a large circle. This circle becomes larger and larger as the shoulder injury improves. The circumduction should be made inward—that is, from vertical across in front of face.

## b. Exercises with apparatus.

## EXERCISE 9: DUMBBELLS

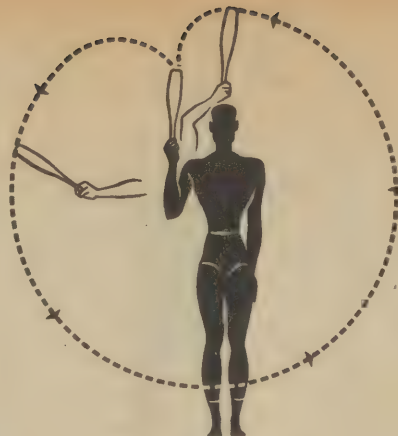
Sit or stand, holding dumbbells at sides (start with 1-pound dumbbells and increase the weight as the strength increases). Raise arms sideward to horizontal position.





**EXERCISE 10:  
SHOULDER LADDER**

Move arm upward by climbing ladder (or wall), going a little bit higher every day. Fingers climb up to point of pain, unless the prescription is otherwise. If the movement prescribed is forward, stand with injured shoulder directly in front of the ladder; if the movement is sideways, stand with injured shoulder sideward toward the ladder. Movement sideward and upward should not be undertaken by a patient with a recent dislocation.

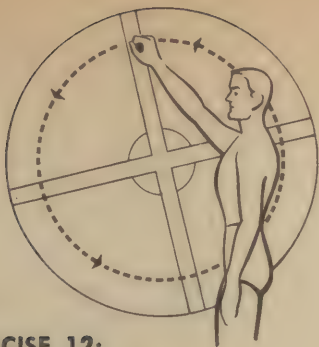


**EXERCISE 11: INDIAN CLUBS**

Hold club with the ball in the palm of the hand, and the neck between the thumb and first finger. This exercise has two variations:

Flex elbow so that hand is in front of the shoulder and club is extended upward. Extend arm upward then swing club laterally in a large circle, starting outward and away from the body, then crossing the body up toward the other side. Keep arm straight until circle is completed, then lower arm to starting position.

Swing club backward and upward, then swing downward but cross body to the opposite side. Continue swinging backward and upward on that side (arm is still crossed over body). Swing downward, crossing body to original position.



### EXERCISE 12: SHOULDER WHEEL

This wheel is 4 feet in diameter. It has an adjustable handle and is fastened to an adjustable axle pin on the wall. The wheel can be tightened so there will be different degrees of resistance.

Hold the adjustable handle and stand with either the side or the front of the body toward the wheel. Turn the wheel throughout its range. This exercise is for limbering and strengthening an injured shoulder which has already healed.

### EXERCISE 13: HORIZONTAL BAR

The pull-up on the horizontal bar may be executed in several different ways. For the mildest exercise, grasp the bar which is about 5 feet in height, and with the arms suspended let the body slant backward so that the weight rests on the heels. Flex the elbows and pull chin to bar.

Part of the body weight continues to be supported on the feet. Keep body straight throughout exercise.

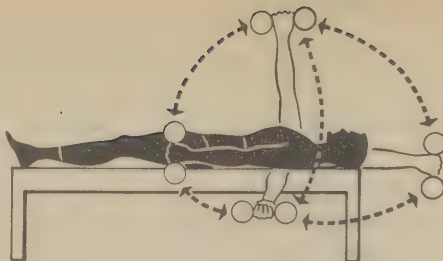
For a more severe exercise, use a higher bar and execute pull-ups by partially bending the knees and then straightening them, thus supporting some of the weight on the legs.

For the most severe exercise, use a bar about 8 feet in height and pull up the entire weight of the body by the arms.



## EXERCISE 14: WEIGHTS

Lie in supine or prone position on a bench which is about  $1\frac{1}{2}$  feet high, 1 foot wide, and 4 to 5 feet long. Using bar bell weights or dumbbells of from 5 to 15 pounds, execute arm movements, keeping the elbows straight.

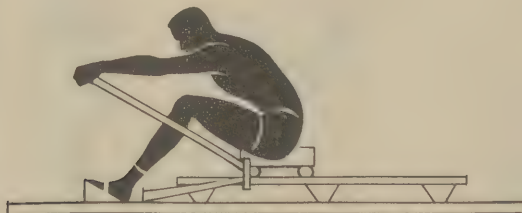


## 119. EXERCISES FOR ELBOW.

In addition to the exercises below for the elbow, bag punching and exercises on the pulley weights may be given. Bag punching should be given only to patients nearing complete recovery. In the beginning, pulley weights should be very light. Their weight increases with the tolerance of the muscles and joints.

## EXERCISE 15. ROWING MACHINE

Execute ordinary movements of rowing.



**a. Exercises without apparatus.**

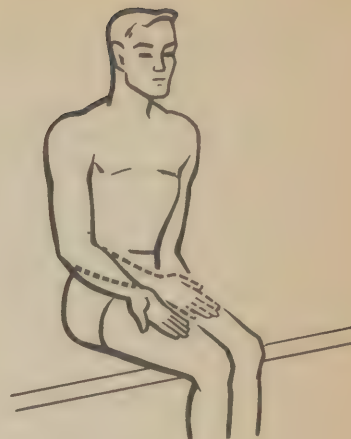
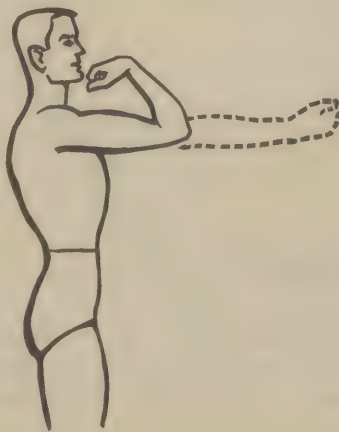


**EXERCISE 1:**

This exercise can be done while lying, sitting, or standing. Grasp wrist of affected arm. Flex and extend elbow up to point of pain, or as otherwise prescribed by the ward officer.

**EXERCISE 2:**

This exercise can be done either sitting or standing. Flex and extend the elbow with the arm in various positions, thrusting the hand upward, sideward, or forward. Utilize the full motion of the joint to its present limit, but not enough to produce pain.



**EXERCISE 3:**

Sit on a chair or bed. Bend elbow at  $90^{\circ}$  and rest forearm on top of the thigh. Keep palm up. Rotate the forearm to the limit of pain, then place palm down on the other thigh.



#### EXERCISE 4:

Stand about 2 or 3 feet away from the wall and face it. Place hands against the wall keeping arms at shoulder level. Lean forward, permitting body weight to bend the elbows. Then press against the wall and push to erect position. As the strength and range of motion of the joint improve stand farther and farther from the wall.



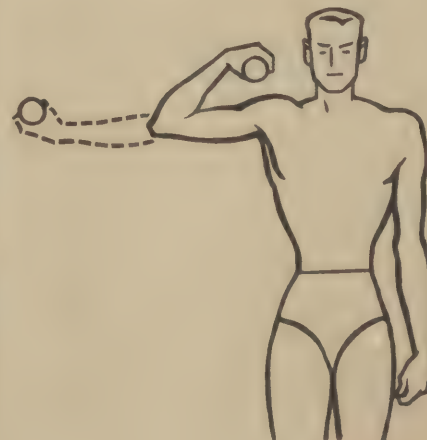
#### EXERCISE 5:

Resting on hands and knees, lean forward and bend elbows, lowering chest towards floor. Then push back up.

#### b. Exercises with apparatus.

#### EXERCISE 6: DUMBBELLS

This exercise can be done either sitting or standing. Flex and extend elbow with the arm in various positions, holding a light weight in the hand. Begin with a weight of one pound and increase it as the tolerance of the joint increases.



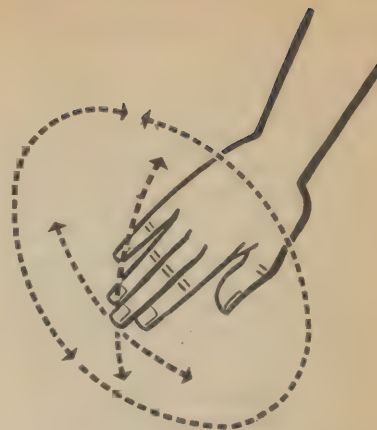


## EXERCISE 7: INDIAN CLUBS

Hold club with the ball in the palm, and the neck in the crotch of the hand between the thumb and first finger. Combine small circles with large circles. The small circle will be above and to the side of the shoulder and will alternate with a large shoulder circle.

## EXERCISE 8: HORIZONTAL BAR

Grasp bar, which is about 5 feet in height, and with arms suspended let the body slant backward so that the weight rests on the heels. Flex the elbows and pull chin to bar. Part of the body weight continues to be supported on the feet. Keep body straight throughout exercise.



## 120. EXERCISES FOR WRIST.

Sitting or standing, with hand open or clenched, undertake all normal movements of the wrist (flexion, extension, abduction, adduction, and circumduction). These exercises may be taken with no weight in the hand, or with a light (and increasingly heavy) dumbbell. Care should be taken not to put too much strain on the part of the wrist which received the injury.

## a. Exercises without apparatus.

### EXERCISE 1:

This exercise can be done while lying, sitting, or standing. Hold hands in front of chest, placing finger tips of both hands together and keeping elbows outward. Press palms of the hands together, and then outward again by pressure on the fingers. This pressure on the wrist can be made more strenuous by raising the elbows and depressing the wrists.



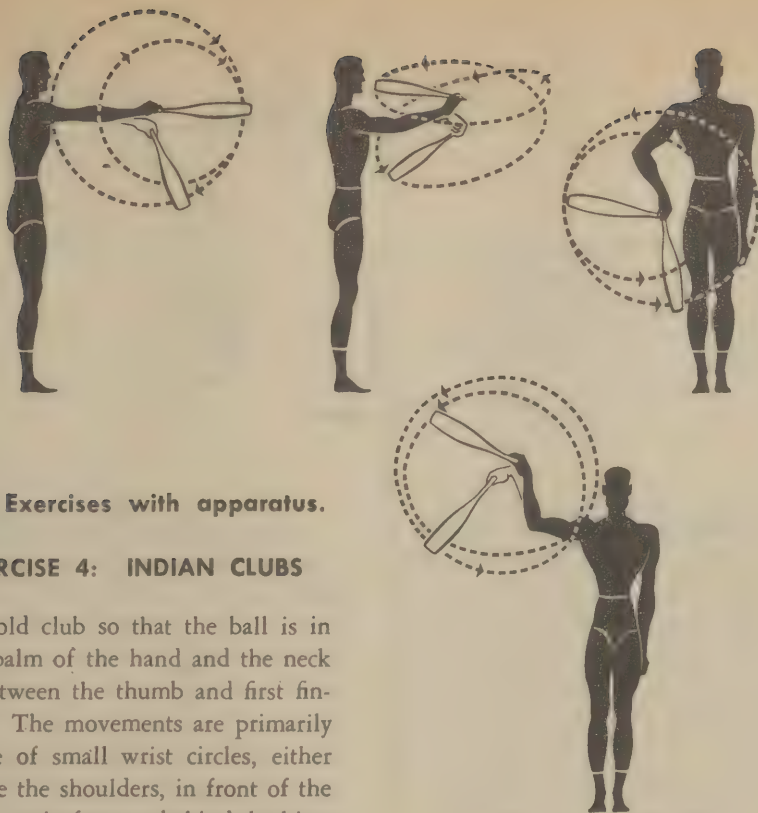
### EXERCISE 2:

Stand about 2 or 3-feet from the wall and face it. Place hands on wall at shoulder height. Lean forward permitting weight to bend elbows and force wrists backward to the limit imposed by pain. Then force body backward away from the wall by pressure of the fingers. This exercise can be made more severe by lowering the position of the hand on the wall.

### EXERCISE 3:

Stand in front of a low table or bench. Place hands on the table with fingers pointing away from the body. Press downward on the table, moving elbows forward in the direction of the fingers and obtaining a forced dorsiflexion.

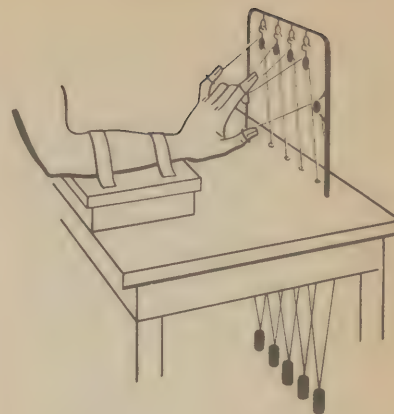




## b. Exercises with apparatus.

### EXERCISE 4: INDIAN CLUBS

Hold club so that the ball is in the palm of the hand and the neck is between the thumb and first finger. The movements are primarily those of small wrist circles, either above the shoulders, in front of the body, or in front or behind the hips.

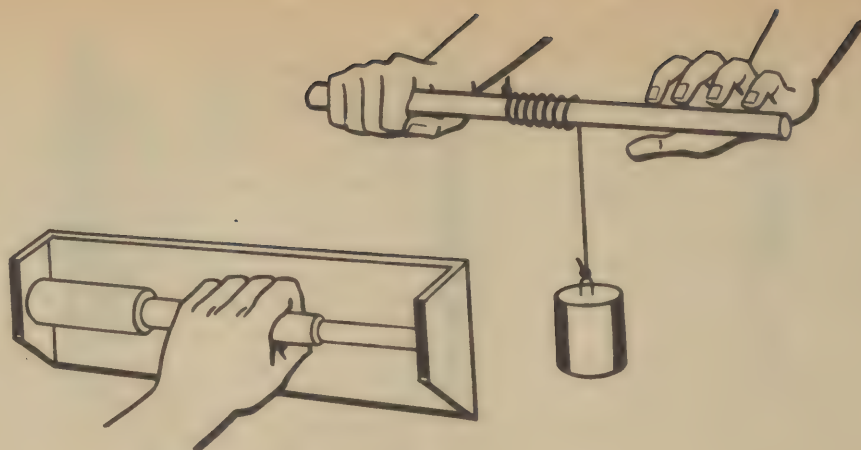
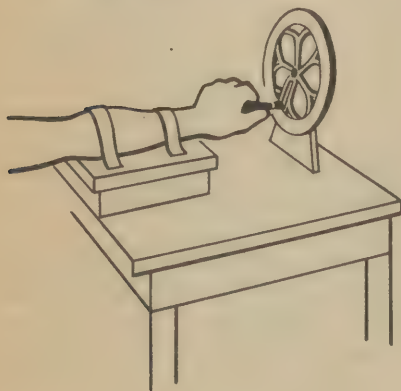


### EXERCISE 5: HAND, WRIST, AND FOREARM TABLE

This arrangement of small finger pulleys on a table is designed to flex any of the joints of the fingers or wrist. Flex both the fingers and the wrist.

## EXERCISE 6: WRIST CIRCUMDUCTOR

This apparatus consists of a block and a wheel with a handle on it. The wrist is strapped to the block. In turning the wheel by the handle, the fingers and hand move in a circle the circumference of which is at a right angle to the forearm. The size of the circle may be changed as the hand and wrist become more flexible.



## EXERCISE 7: WRIST ROLLER

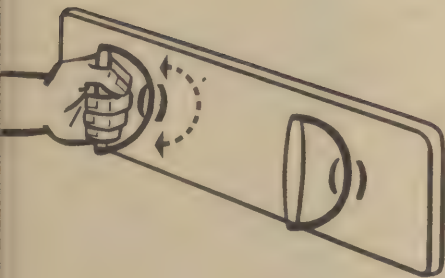
This roller resembles a towel rack, except that the rod is divided into three sections, each with a different diameter. Move the roller forward or backward by bending the wrists away from or toward the body. The roller has a brake which can regulate the amount of resistance offered this movement.

Similar exercise may be obtained from apparatus improvised from a broomstick and a rope. One end of the rope is knotted through the middle of the broomstick, the other end has a weight on it. Rotate the broomstick away from the body, using the wrists and forearms, to wind the rope on the stick. Then reverse the action to unwind it.



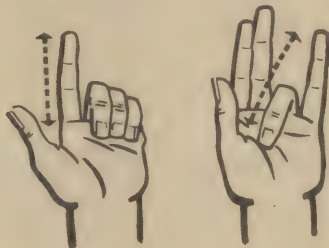
# EXERCISE 8: WRIST ROTATOR

This apparatus consists of two handles which the patient twists to the right and left so that he supinates and pronates his forearms. The apparatus can be adjusted to regulate the amount of resistance offered.



## 121. EXERCISES FOR HANDS AND FINGERS

Finger exercises can be done from almost any starting position: sitting, standing, or lying.



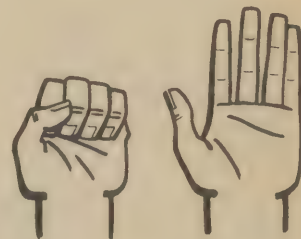
### a. Exercises without apparatus.

#### EXERCISE 1:

Move the fingers one at a time in various directions. Flex and extend each finger separately. Pull thumb and fingers together one at a time. Touch base of little finger with thumb and base of the thumb with the little finger. Touch the base of the thumb with each one of the other fingers.

## EXERCISE 2:

Flex and extend fingers to the fullest extent possible within the limits imposed by pain or undue fatigue. This can be done by clenching and extending the fingers, as hard as possible or by resisting with the other hand.



### EXERCISE 3:

Spread fingers as widely as possible and then pull them together as tightly as possible:



### EXERCISE 4:

With backs of fingers resting on top of thigh and elbows forward, unroll the fingers, offering some resistance by pressing downward with the arms. When properly executed, this exercises the extensors of the fingers.

### EXERCISE 5:

Hold hands in front of body and pronate and supinate the forearm to the limit of motion. The fingers and thumb attempt to continue the motion after the forearm has been fully turned.



### b. Exercises with apparatus.

Because of the danger of reinjury to the hand and fingers, the patient should be prohibited from boxing, bag punching, or doing exercises that might cause strain until the hands and fingers are thoroughly strong again.

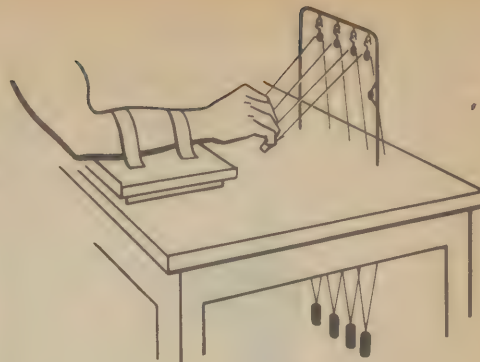


### EXERCISE 6: BALL

Squeeze a resisting ball such as an old tennis ball or handball. (A rolled-up handkerchief, piece of newspaper, or a ball of yarn may be substituted.) Squeeze it over and over again until the forearm muscles become fatigued.

### EXERCISE 7: HAND, WRIST, AND FOREARM TABLE

This arrangement of small finger pulleys on a table is designed to flex any of the joints or the fingers or wrist. Flex fingers only.



### EXERCISE 8: FINGER LADDER

This is a series of small steps. Climb ladder, either flexing or extending fingers. Ladder may be placed vertically or horizontally.

## 122. EXERCISES FOR HIP

### a. Exercises without apparatus.



#### EXERCISE 1:

Stand on good leg by the side of the bed. Circumduct the hip in larger and larger circles.

#### EXERCISE 2:

Stand erect and do a stationary walk. This is like marking time, except that the knee action is higher. Lift the knee higher and higher as the hip disability improves.



#### EXERCISE 3:

Stand with feet parallel and one foot apart. Do a one-fourth to one-half knee-bend.

**EXERCISE 4:**

Stand with feet separated from 3 to 4 feet and toes pointed out. Bend first one knee and then the other, letting the body sway first over one foot and then over the other to a position like that of a sideward lunge.

**EXERCISE 5:**

Stand with feet separated  $1\frac{1}{2}$  feet and toes pointed out. Execute a squat, keeping heels on floor.

**EXERCISE 6:**

Stand with feet separated  $1\frac{1}{2}$  feet. Do a full knee-bend, keeping heels off floor.





# EXERCISE 7:

Lie on back, in bed. Raise knee, sliding heel along the lower sheet towards hip. Then extend the knee again. Flex the knee more and more and keep the heel off sheet as the local hip condition improves.

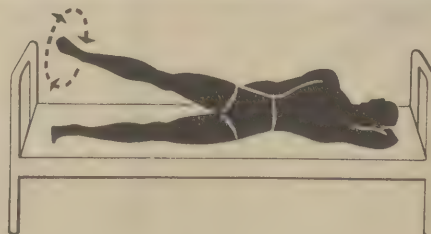


# EXERCISE 8:

Lie face down on bed. Raise leg backward as far as possible without pain. This may be done either with the knee bent or straight.

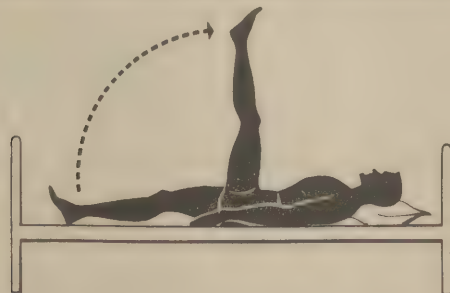
# EXERCISE 9:

Lie on side in bed, with injured hip upward. Circumduct the upper leg, making small circles. The circles should become larger and larger as the hip disability improves.



# EXERCISE 10:

Lie on back, in bed, with feet separated about 2 feet. Rotate the thigh outward as far as possible, then inward as far as possible.



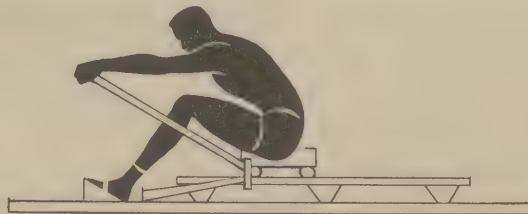
# EXERCISE 11:

Lie on back and flex thigh, raising leg upward as far as possible without pain. Keep knee straight.

## b. Exercise with apparatus.

# EXERCISE 12: ROWING MACHINE

Execute regular movements of rowing.



## 123. EXERCISES FOR KNEE

### a. Exercises without apparatus.

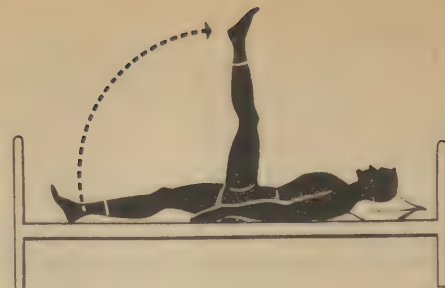


#### EXERCISE 1:

Lie on back in bed with legs straight, or sit in chair with heel of leg to be exercised on another chair. Contract the quadriceps extensor, pulling the kneecap upward. At the same time, further straighten the knee. Hold contraction from 5 to 10 seconds, then relax for an equal length of time.

#### EXERCISE 2:

Lie on back in bed. Raise the whole leg keeping knee straight. The leg may be raised to the vertical.



#### EXERCISE 3:

Lie on back in bed. Slide heel up the sheet towards the hip. Bend the knee as much as possible without marked discomfort.

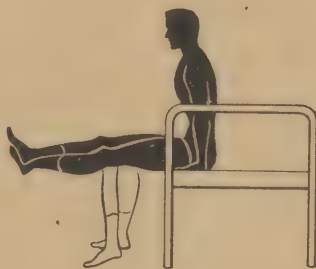


#### EXERCISE 4:

Lie on back with legs upward at right angles to trunk. Cross sound leg over the other at the ankles. Flex and extend the knees with the injured leg lifting the weight of the opposite foot.

#### EXERCISE 5:

Sit on the side of the bed with legs hanging over and knees flexed to right angle. Extend legs until knees are straight. This may be done against some resistance by placing a sand bag across the toes.



#### EXERCISE 6:

Sit on side of bed with legs hanging over. Knees are flexed to right angle. Cross the sound leg over the injured leg at the ankles. The good leg resists the extension of the injured leg.

## EXERCISE 7:

Stand and do a stationary walk. This is like marking time, except that the knee is moved higher and higher each time.



## EXERCISE 8:

Lie face down with affected knee flexed. Extend knee against resistance offered by attendant or another patient who has been trained to give the right amount of resistance. Two patients with the same disability may work together.

## b. Exercises with apparatus.

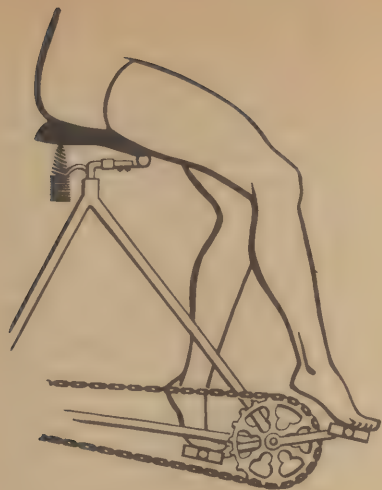
## EXERCISE 9: KNEE ROCKER

This small segment of a cylinder has a flat top which is 14 inches long and about 12 inches wide. It has a rocker bottom about 5 inches deep.

Stand on top of rocker with one foot on either end. Rock from side to side, alternately flexing and extending the knees.







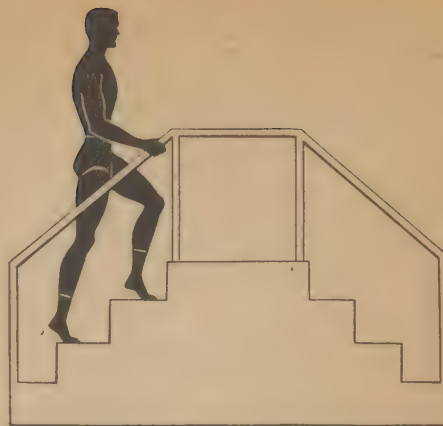
### EXERCISE 10: STATIONARY BICYCLE

This apparatus is built so that the resistance it offers may be increased. It is used for strengthening the knees and the thigh muscles.

### EXERCISE 11: STAIRS

This is a series of steps with a hand rail.

Walk up and over and down. Repeat for the prescribed number of times.



### EXERCISE 12: HIGH STEPPER

This ladder has one adjustable end that can be raised various distances from the floor. Begin by setting this end at about 6 inches. Increase this height daily:

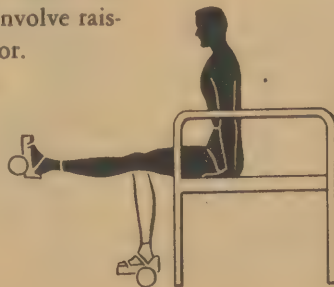
Walk the length of the ladder, stepping between the rungs. Lift the knees higher and higher when approaching the high end.



### EXERCISE 13: IRON BOOTS

These are sandals of iron which are strapped on the feet. Dumbbells of varying weights can be fastened to the sandals. These boots may be used for leg or thigh flexor and abdominal development. They are excellent for exercising the quadriceps muscles.

Thrust leg over the side of the bed. Strap boot, with the desired weight dumbbell, to the foot. Flex and extend the knee repeatedly. To exercise the thigh flexors and abdominal muscles, place boots on both feet and, lying on back, do various exercises which involve raising the legs from the floor.



### EXERCISE 14: PULLEY WEIGHTS

For special strengthening of individual muscle groups, attachments of various kinds may be fastened to one or both handles of a pulley weight machine.

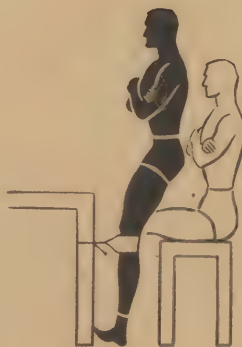
Using the foot attachment, lie face down on the floor or massage table, with head toward pulley weight, and flex and extend knee. This is an excellent exercise for Class 3 patients who have had knee injuries or operations.



## EXERCISE 15. QUADRICEPS EXTENSOR EXERCISER

This device consists of two loops of webbing fastened to the end of a bed or of a massage table, or to the wall. These loops—which should be padded—should be about 3 inches wide, and large enough for the feet to be thrust through. There should be solid footing beneath the loops, against which the trainee may brace his feet.

Sit on a chair or stool in front of these loops, place legs in the loops, and adjust them so that they will be just below the knee. Sit erect, then leaning back come to a stand. Return to the stool. To make the exercise more effective, increase the distance leaned back before rising.



## 124. EXERCISES FOR ANKLE.

In addition to the exercises below, the exercises for the feet (par. 125) may also be used for the ankle. These exercises may also be supplemented by various forms of ward fatigue involving walking.

### a. Exercises without apparatus.

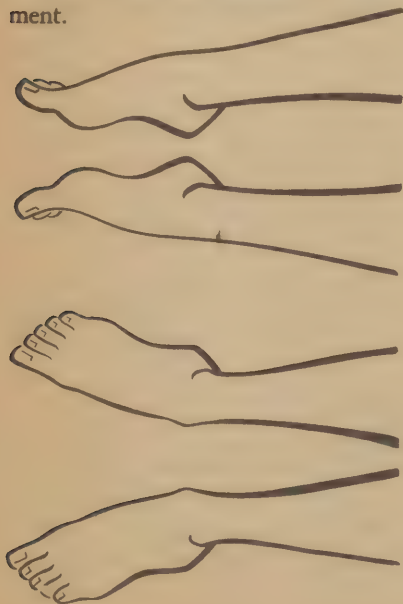


### EXERCISE 1:

Lie on back in bed. Extend feet as far as possible, pointing toes downward. Then flex feet as far as possible, pointing toes upward.

## EXERCISE 2:

Lie on back in bed. Turn soles of feet inward so that they face each other, and then outward. This is inversion and eversion of the feet. The inward movement should be stronger than the outward movement.



## EXERCISE 3:

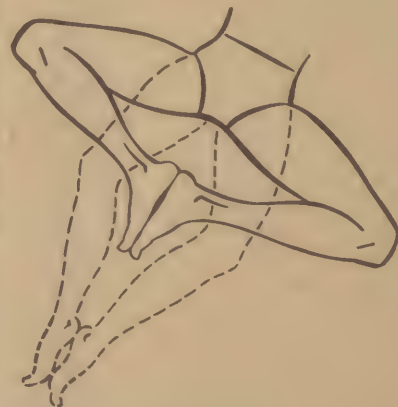
Lie on back in bed, with feet separated about 2 feet. Move each foot in such a way as to circumscribe a small circle, with the ball of the foot going first down, then in, then up. This circle should be to the limit of comfortable motion.

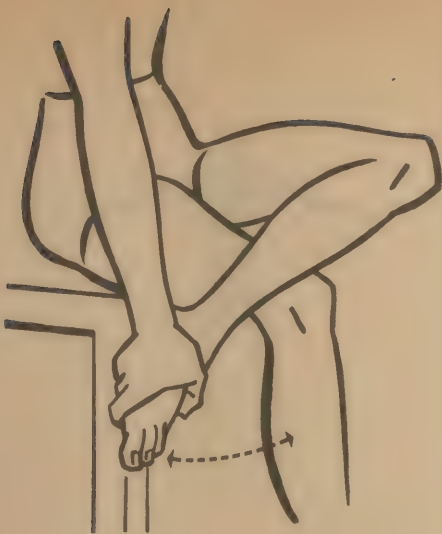
## EXERCISE 4:

Sit on the side of the bed with the feet hanging down. Do movements for exercises 1, 2, and 3 above.

## EXERCISE 5:

Lie on back with knees apart and bent, soles of feet against each other, and outsides of feet against the bed. Slide feet up towards the hips as close as possible, and then down towards the foot of the bed. Keep the soles of the feet together as much as possible.





#### EXERCISE 6:

Sit on side of bed, or chair, with injured ankle resting on opposite knee. Using hand, forcibly flex and extend the foot to the limit imposed by pain.

#### EXERCISE 7:

Stand erect, barefooted or in shoes. Walk on the outsides of the feet.



#### EXERCISE 8:

Stand with feet 1 foot apart and toeing in. Rise on toes as high as possible without pain.



# EXERCISE 9:

Stand erect, then rise as high as possible on heels.



# EXERCISE 10:

Stand with feet flat on the floor, about 1½ feet apart, and toes forward. Squat as far as possible without raising heels from the floor. Keep trunk upright.



# b. Exercises with apparatus.



# EXERCISE 11: ANKLE DISK

This is a round plank 14 inches in diameter which has half a croquet ball screwed to the bottom.

Stand with one foot near each edge of the disk. Make the disk run around its edge on the floor.

## 125. EXERCISES FOR FEET AND TOES.

In addition to the exercises below, short marches are effective in strengthening the feet and toes if the men push off hard as their feet leave the ground.

### b. Exercises without apparatus.



#### EXERCISE 1:

Lie on back in bed. First extend feet and toes towards the foot of the bed, then flex them towards the head of the bed. In this movement emphasize the motion of the toes, rather than that of the ankles.

#### EXERCISE 2:

Lie on back, or sit on the edge of the bed, with the feet hanging over the edge of the bed. Turn soles of the feet towards each other, then outward. Try to make the toes go beyond the limit of the feet. Emphasize the inward motion for the soles; however, go the limit in each direction for the toes.



#### EXERCISE 3:

Stand erect. Walk and "grip the floor" with the toes. If a patient is at a hospital where he can walk in sand, it is excellent therapy for him to walk barefooted, gripping the sand with the toes.



#### EXERCISE 4:

Stand erect. Walk on the outside of the feet with the inside of the feet raised.

#### b. Exercises with apparatus.

#### EXERCISE 5: MARBLES

Sit on a chair with the bare feet resting on a bath towel, about 1 foot apart. Hands are on knees. Pick up small stones or marbles with the toes, and lift them to the hand on the opposite knee.

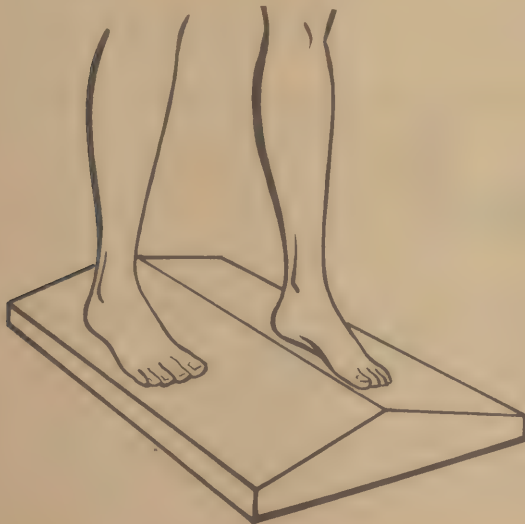


#### EXERCISE 6: BATH TOWEL

Try to pick up fold of bath towel with the toes or to bunch towel between feet by everting the feet.

## EXERCISE 7: FOOT INVERSION TREAD

This device consists of two boards which are built like a broad inverted V. Walk length of the boards. This exercise strengthens the knees and feet that tend to be pronated.



**126. EXERCISES FOLLOWING ABDOMINAL OPERATIONS.** *After an abdominal operation no exercise should be started until permission is received from the surgeon in charge.* The exercise should be very gentle at first and should not cause the area of the operation to contract appreciably. After healing has progressed to a degree approved by the medical officer, more strenuous exercises can gradually be introduced. The following exercises may be used in this order:

### a. Gentle.



### EXERCISE 1:

Lie on back. Slide heels up the sheet until they approach position of hips. If chest is kept high, there is little strain on the abdominal muscles, as most of it comes on the ilio-psoas muscle.

## EXERCISE 2:

Lie on back. Raise one leg until foot is about 12 inches above the sheet, then return. Alternate legs.

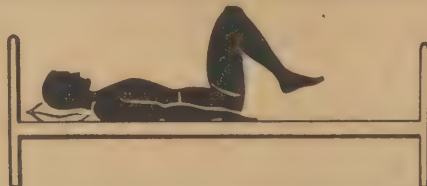


## EXERCISE 3:

Lie on back. Raise the head from the bed, and continue lifting until conscious of a stretch of the abdominal operation.

## EXERCISE 4:

Lie on back. Raise both knees from bed, keeping back flat on sheet.



## b. Moderate.



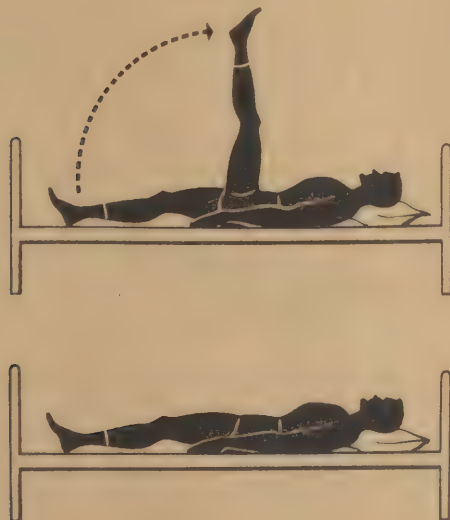
## EXERCISE 5:

Lie on back. Raise first one shoulder from the bed, then the other. Raise until there is just a *slight* strain on the abdominal muscles.

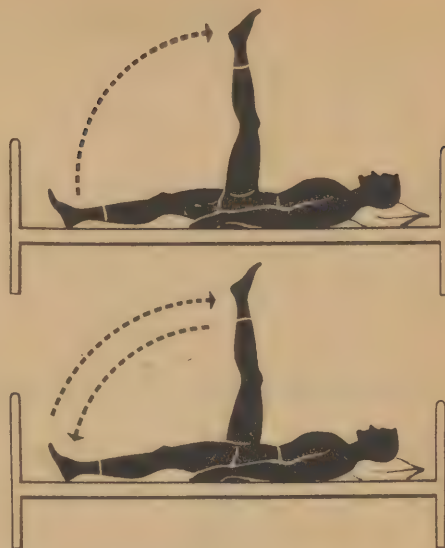


# EXERCISE 6:

Lie on back. Raise one leg from the bed and return. Then raise the other leg, trying to reach the vertical. Keep knees straight and back flat.



## c. Moderately advanced.



# EXERCISE 7:

Lie on back. Raise one leg from bed. Then return leg and at the same time raise the other leg. Keep knees straight and back flat.



### EXERCISE 8:

Lie on back with arms at sides and feet separated about 2 feet. Raise head and shoulders from bed, raising right shoulder the higher. Touch left knee with right hand and at the same time raise left leg 6 inches off bed.



### EXERCISE 9:

Lie on back with arms at sides. Sit up, getting some help from forearms if necessary.

**d. Advanced.** The exercises below are taken while lying on an *inclined board*. This board may be about 8 feet long and 2 feet wide and fixed on a framework so as to make a 40° angle with the floor. A similar board may be used which has two hooks on the upper end for hanging over any rung of the stall bars. If it is the latter kind, the hooks should be taped. The surface of the board should be well padded. The patient lies on his back on the board, with his feet up and ankles under the straps. Exercises of varying degrees of difficulty may be performed in this position. A number of these follow:



### EXERCISE 10:

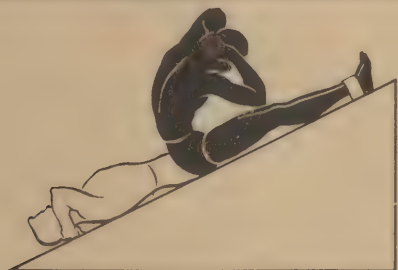
Raise head and shoulders from the board, keeping hands on the fronts of the thighs and lumbar spine in contact with the board.

**EXERCISE 11:**

Raise the head and shoulders from board, the right shoulder higher than the left. Reach across, touching the left knee with the right hand. Repeat for the opposite side. Keep lumbar spine in contact with board throughout exercise.

**EXERCISE 12:**

Sit all the way up and lie back again.

**EXERCISE 13:**

Sit up, keeping hands clasped behind the head. Turn the trunk and touch one elbow to the opposite knee. Alternate sides on each successive sit-up.



#### EXERCISE 14:

Raise trunk to an upright sitting position, keeping body vertical and arms horizontally at side. Then rotate the trunk from right to left and from left to right.

#### EXERCISE 15:

Do sit-ups while holding a weight behind the neck with the hands (weight can be from 5 to 25 pounds). This exercise should be attempted only by those who can do 20 sit-ups with the hands behind the head, without the weight.



## 127. LUNG VENTILATION EXERCISES.

### a. Exercises without apparatus.



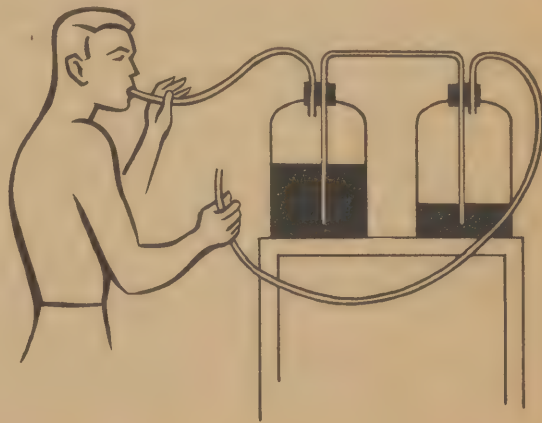
### EXERCISE 1: FOUR-COUNT BREATHER

Lie on back with hands on hips. Inhale on four counts, taking a deeper breath on each count. (Usually patient will have inhaled fully by third count, but he should try to inhale more fully on the fourth count.) Then exhale in "waves" in four counts, trying to blow all of the air out on the last two counts.

### b. Exercise with apparatus.

### EXERCISE 2: BLOW BOTTLES

Two 2-liter bottles are so fitted with rubber and glass tubing that blowing into one tube will move the water from one bottle into the other bottle. Then blowing through another tube will move the water back to the first bottle. Take large breaths and blow steadily. This exercise is frequently prescribed for patients who have had pneumonia, and where resolution is not complete.





## CHAPTER 10

### TESTS OF PHYSICAL FITNESS

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#### Section I. PERFORMANCE TESTS

**128. GENERAL.** The tests described below consist of six events which are designed to test muscular strength, muscular endurance, cardiovascular endurance, and agility. These tests are used only with Class 1 and 2 trainees.

**129. PURPOSES.** The purposes of physical fitness tests are—

- a. To determine the physical fitness of the men at the beginning of their stay in Class 2.
- b. To follow their progress through Classes 2 and 1 until they are discharged for duty.
- c. To motivate the men to make a determined effort to improve.
- d. To determine the effectiveness of the physical fitness program.

**130. ADMINISTRATION.** a. All Class 2 and Class 1 patients should be tested once a week. It is better to test them near the end of the week rather than at the beginning. The test should be given in two periods of three tests each, and in the following order:

#### *First day*

<i>Class 1</i>	<i>Class 2</i>
Squat thrusts in 60 seconds.	Squat thrusts in 60 seconds.
Pull-ups.	Pull-ups.
Squat jumps.	Full squats.

#### *Second day*

Push-ups.	Push-ups.
Sit-ups.	Sit-ups.
300-yard run.	180-yard run.

b. The test elements should be used from day to day in the conditioning exercise period as practice events. Most of these, with the exception of the pull-ups, are elements of the calisthenic drill.

c. Trainees who have a disability which might be aggravated by a given test should not be permitted to engage in that test. A man who has had a shoulder or an elbow operation should not be permitted to pull up or to push up. A man who has had a knee operation should not do the squat thrust or squat jump without prescription of the medical officer.

d. Before undertaking any of the tests officially, trainees should be given practice in all of the test elements except the 180- and 300-yard run. A trainee should not exert himself to the limit in this practice. Many of the events, however, involve mastery of form which he must first learn if the test is to be satisfactory.

e. After testing, the judge records the result of each performance on the trainee's score card, with the corresponding number of points from the scoring table. To obtain the Physical Fitness Score, total the number of points made in the six events and divide the sum by six. It would not be necessary to divide the points by six, were it not for the fact that some of the men will be unable to do all events. When a man is able to do only four to five events—because of physical disability—then divide the total number of points for the events

he executes by the number of events in which he participates. The men should be told what constitutes a good or poor performance for their age group and class so that they may be motivated to reach superior performance. (See table III.)

f. The tests should be given according to the instructions and rules given in FM 21-20. Since the 180-yard run and the full squat are not included in FM 21-20, the rules for these two events are given below. Tables IV and V are used to score these two events in the same manner as the scoring tables for the other events given in FM 21-20.

(1) *180-yard run.* This race is used by the Class 2 trainees. The set-up is the same as for the 300-yard run except that the men simply run three lengths around two stakes. The starting position and the method of running is the same as in the 300-yard run. The scoring is done in the same way.

(2) *Full squat.* This event is used with the Class 2 trainees.

(a) *Starting position.* Performer stands with feet about 9 inches apart and arms in the thrust position, hands made into a fist and held just below the shoulders.

(b) *Movement.* Performer bends knees as far as possible, squatting clear down and thrusting arm forward in position to assist in the balance.

(c) *Scoring.* Each time the performer makes a full knee bend and comes back to the standing position, he is credited

with one full squat. The movement is not scored if (1) he fails to descend to a complete squat, (2) he fails to straighten his legs completely when he returns, (3) he assists in the movement by pressing down on his knees, or otherwise departs from the form described. The movement must be continuous. He may not rest between movements. He is not penalized however, if the arm position is not correct.

**131. PHYSICAL FITNESS TEST SCORING TABLES.** The scoring tables (tables IV and V) are based on the physical condition of well-conditioned service men and are so constructed that a score of 50 is average for such a group. Some recruits will present scores running from low (0 to 20) to very

high (80 to 100). After 1 or 2 months of training, scores below 30 should generally be considered as unsatisfactory. Extra motivation and a supplementary training program should be provided for men making such scores. In the reconditioning program, many men, after an illness, will be far down the scale. By the end of 4 weeks, however, after a man has entered Class 2, he should perform at the 45-point level or above. Scoring tables should be posted on bulletin boards in the barracks, so that trainees may follow their progress. In reconditioning programs in which the average performance drops much below 50 for Class 1 trainees, the program should be carefully examined to see whether or not the exercise is sufficiently strenuous.

**TABLE III**

<b>PHYSICAL FITNESS SCORE (CLASS 1A)*</b>					
<b>AGE GROUPS</b>	<b>EXCELLENT</b>	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>	<b>VERY POOR</b>
<b>Under 25 years</b>	<b>Over 74 points</b>	<b>59-74</b>	<b>43-58</b>	<b>26-42</b>	<b>Under 26 points</b>
<b>25-29 "</b>	<b>" 69 "</b>	<b>54-69</b>	<b>38-53</b>	<b>22-37</b>	<b>" 22 "</b>
<b>30-34 "</b>	<b>" 64 "</b>	<b>49-64</b>	<b>34-48</b>	<b>19-33</b>	<b>" 19 "</b>
<b>35-39 "</b>	<b>" 59 "</b>	<b>45-59</b>	<b>30-44</b>	<b>16-29</b>	<b>" 16 "</b>
<b>40-44 "</b>	<b>" 54 "</b>	<b>41-54</b>	<b>27-40</b>	<b>13-26</b>	<b>" 13 "</b>

*\*For Class 1b, subtract 3 points (fair would be 40-55). For Class 2a, subtract 6 points (37-52). For Class 2b, subtract 9 points (34-49).*

TABLE IV

## SCORING TABLE—180-YARD RUN

TIME	27	28	29	30	31	32	33	34	35	36	37
POINTS	100	85	73	62	52	42	32	24	16	8	1

TABLE V

## SCORING TABLE—FULL SQUATS

SQUATS	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
POINTS	1	3	5	7	9	11	13	14	16	17	19	20	22	23	25	26	27
SQUATS	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
POINTS	28	30	31	32	33	34	35	37	38	40	41	42	43	44	45	46	47
SQUATS	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
POINTS	48	49	50	51	52	52	53	54	55	56	57	57	58	59	60	61	62
SQUATS	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
POINTS	62	63	64	65	65	66	66	67	67	68	69	70	71	72	72	73	73
SQUATS	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
POINTS	74	74	75	75	76	76	77	77	78	78	80	80	81	81	82	82	83
SQUATS	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
POINTS	83	84	84	85	85	86	86	87	87	88	88	89	89	90	90	91	91
SQUATS	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
POINTS	92	92	93	93	94	94	95	95	96	96	97	97	98	98	99	99	100



## Section II. CARDIOVASCULAR TESTS

**132. TEST FOR CLASS 3 PATIENTS.** The judgment of the medical officer is sufficiently accurate to determine whether or not an ordinary medical patient may be assigned to the Class 3c exercise program. In the diseases of limited duration, it is usually safe to begin exercises on the second day after the cessation of fever. Where there is doubt, however, the surgeon may wish to check his judgment with an objective test. The cardiovascular tests devised by the Medical Department of the Army Air Forces may be used.

a. These tests are all based on the response of the heart rate to stepping up on a box 20 inches high at a rate of 24 steps per minute. The patient should be rested, and should not have climbed stairs or walked any considerable distance immediately before undergoing the test. The tester should use a metronome to set the pace. The patient, upon command, places one foot on the box and steps up until the knee is straight. The other foot is then placed upon the box on the second count. On the third count the first foot steps off the box to the floor, then on the fourth count the other foot steps down to the floor again. The procedure is repeated as directed. For example, if the patient starts with the left foot, the stepping is left, right, left, right. The metronome should be set for 96 beats a minute, and a step taken on every beat.

b. It should be emphasized that it is not necessary to test all patients. In fact, it is the exceptional patient that needs to be tested. *The cardiovascular tests are to be used only when the medical officer is in doubt.* Ordinarily, the reactions of patients to the exercise would be sufficient to determine when he is ready to progress from 3c to progressively more strenuous forms of exercise. The nurse or the physical training instructor can conduct the test with sufficient accuracy after a very brief training. Those tests are not as yet fully standardized, and are to be used only as an adjuvant to the evaluation of physical fitness.

**133. FORMS OF TEST.** The tests are divided into two forms. The first is called the "orange test," because passing it indicates that the patient is able to undergo the work of the orange program of Class 3c. The other form of test is more strenuous and should be administered only to those who have passed the orange test. It is scored as either "orange," "blue," or "green" according to the scores made. Passing at either of these levels should admit the patient to the program of that level.

a. "Orange test." The patient steps up on the 20-inch box 12 times in 30 seconds. He then sits down, and his pulse is counted for 30 seconds, beginning 1 minute after he stops the exercise. If his pulse is less than 100 per minute, he is



TABLE VI

SCORING TABLE FOR PROGRESSIVE TEST		
<i>Duration of Exercise</i>	<i>1 Minute Pulse Rate</i>	<i>Classification</i>
<b>BELOW 2'</b>		<b>ORANGE</b>
<b>2'—2' 29"</b>	<b>BELOW 100</b>	<b>BLUE</b>
	<b>ABOVE 100</b>	<b>ORANGE</b>
<b>2' 30"—2' 59"</b>	<b>BELOW 130</b>	<b>BLUE</b>
	<b>ABOVE 130</b>	<b>ORANGE</b>
<b>3'—3' 29"</b>	<b>BELOW 100</b>	<b>GREEN</b>
	<b>100-140</b>	<b>BLUE</b>
	<b>ABOVE 140</b>	<b>ORANGE</b>
<b>3' 30"—3' 59"</b>	<b>BELOW 110</b>	<b>GREEN</b>
	<b>110-170</b>	<b>BLUE</b>
	<b>ABOVE 170</b>	<b>ORANGE</b>
<b>4'—4' 29"</b>	<b>BELOW 130</b>	<b>GREEN</b>
	<b>ABOVE 130</b>	<b>BLUE</b>
<b>4' 30"—4' 59"</b>	<b>BELOW 140</b>	<b>GREEN</b>
	<b>ABOVE 140</b>	<b>BLUE</b>
<b>5'</b>	<b>BELOW 150</b>	<b>GREEN</b>
	<b>ABOVE 150</b>	<b>BLUE</b>

considered to have passed the orange test, and to be ready for Class 3c program.

b. "Progressive test." In this test, to be administered a day or two after the patient has entered the Class 3c program, the patient steps up to the 20-inch box at the rate of 24 steps a minute for not more than 5 minutes. The tester notes the reactions of patient. He is stopped if he becomes too distressed, or if he falters and can not keep the pace set. If he is stopped, or if he stops on his own accord (which is more usual), the time he continued to exercise is noted. His pulse is counted for 30 seconds, beginning 1 minute after stopping the exercise. The patient is classified according to table VI.

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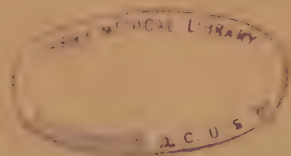
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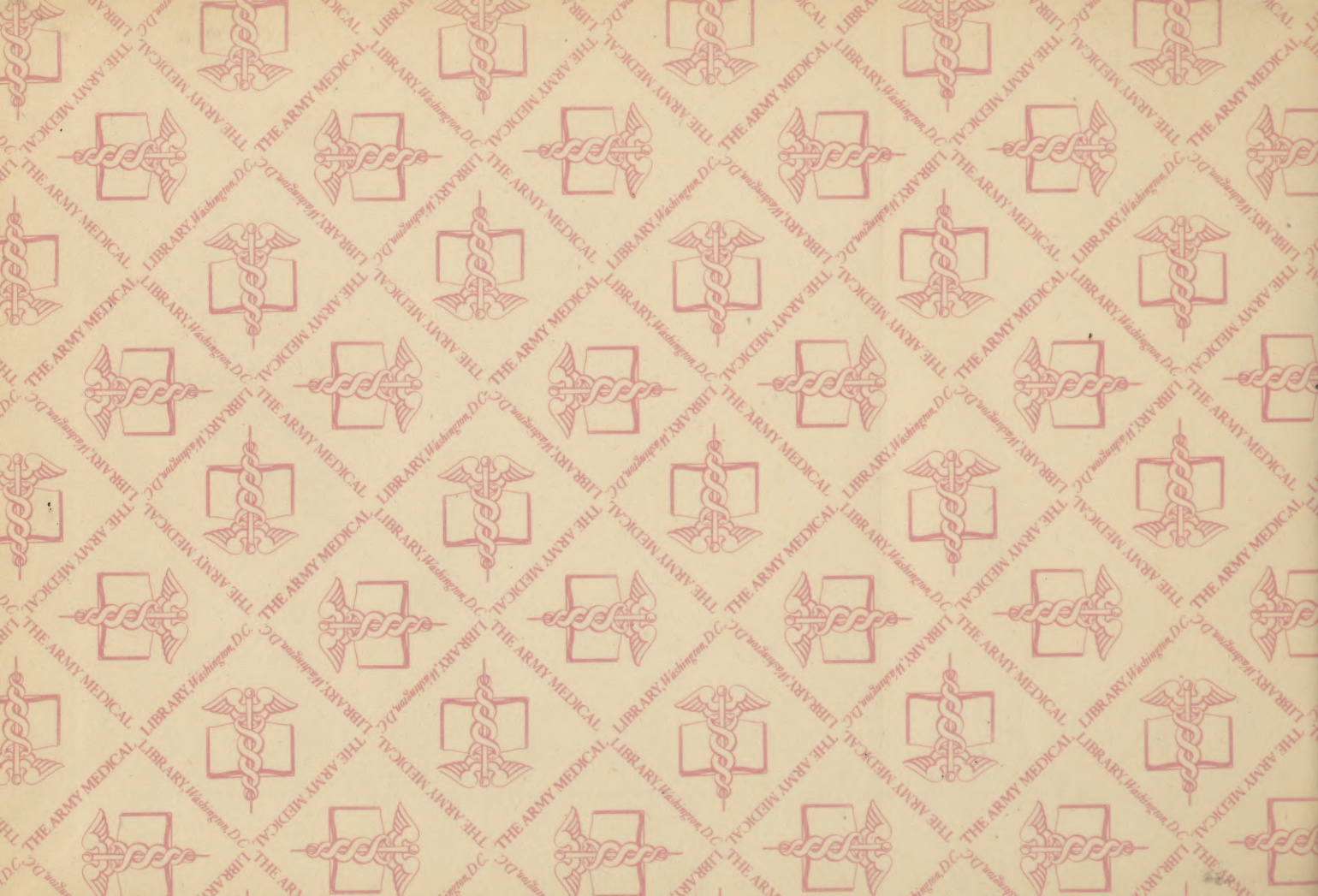
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